EXPERIENCES WITH CONTEMPORARY HOLOGRAPHIC PLATES, MAY 2010

Samples of currently available holographic plates and evaluation samples of Ilford brand materials are tested and compared. the competition includes the BB-640 red sensitive and BB-520 green (orthochromatic) plates from Colour Holographics, Sphere-S panchromatic plates distributed by Geola, although they are also called GEO-3, plus some samples of Slavich brand PFG-01 and PFG-03M.

Notes about the holograms: For some materials, 2.5" (6 cm) square plates were used; otherwise 4" by 5" plates were quartered (although some not so successfully as is evident in the photos) for the maximum use of the materials.

The optics were arranged for a Single beam Reflection set up, about 2 meters throw from the spatial filter with a 20X objective. The 633 nm wavelength of a Uniphase 20 mW He-Ne measured 40 $\mu W/cm^2$ flux in a beam spread that totally covers the waffle iron, but a bit shy of doing 8 by 10's with my He-Ne. For the green wavelength, emitted from a 100 mW Coherent Compass the radiant flux was 70 $\mu W/cm^2$, and its greater divergence through the same optics would more than cover an 8" by 10" plate if so desired to shoot a large one.

Multiplying the flux times the exposure time gave me the exposure energy measured in $\mu J/cm^2$, however this was just the energy in the reference beam, and not taking into consideration the object light.

A piece of cardboard cut to 2 ½" square with one square cut out of the corner was placed on the plate so that ¼ of the holo was exposed at a time, not unlike making a photographic print, for better economy of use of materials and side by side evaluation of exposure doses. The upper right corner is the lowest exposure, with the blocker being rotated counterclockwise so that the highest is in the upper left.

The object was a waffle iron, painted with Krylon #1401 Bright Silver spray paint, whose "pigment" is aluminum flakes, which is not only a good reflector but preserves polarization, giving as low a reference to object beam ratio as possible.

Processing was done in Combi Plan tanks, with racks adjustable for the 4" by 5" plates and those 2 ½" wide. Different materials could then have exactly the same treatment done to them. A variety of developers were used as noted, and I started off using the dreaded CW-PBQ-2 bleach, but my stash of PBQ was oxidized to uselessness, so I switched to a Fe-EDTA formula, which I am not so happy about, since I had always noticed a shift in replay color.

Some plates need to be "activated" for lack of a better word, or rehumidified, and I simply soaked them for a couple of minutes in Kodak Photo-Flo, (Sorry, I still have half a bottle on hand, I will replace it with Ilfotol when the 'Flo runs out.)

Evaluation criteria: Brightness is always paramount, and signal to noise or contrast is also necessary to make the image look as realistic as possible. Black should be black, and not making the object look like it's under water or milk.

Another item of importance for me is whether the holographic replay color is the same as the laser's, and the way to check it is to place the processed hologram back on the object and see if it steals light and casts a shadow, making the image brighter than the object under it. For even more finesse, if the material is truly a faithful reproduction, the image light of the hologram can be made to interfere with the residue object light, causing an interference pattern!

Notes about the photographs: They were all taken with a Nikon D3X and a 60 mm f/2.8 macro lens, moved in close enough so that the height of the hologram fills the short edge of the photo. The holographic plates were placed on black velvet (might notice some dust and hairs in the background) to give best contrast to the holographic image without painting their backs black.

Exposure was taken by reading a Kodak 18% grey card, a portion of which is visible along the right edge of the photos, so a sort of evaluation of diffraction efficiency can be observed in the photos. Surprisingly the Nikon and my trusty old Sekonic Studio Deluxe agreed about the exposures! The Nikon bracketed exposures, but the normal center one was the one used for this report. Sometimes a piece of black tape is at the top of the holograms to prevent annoying internal reflections, which are evident in some of the photos.

Conclusion (10/11/12): The top of the line holographic emulsions are the Ultimate U08 and the Sphere-S GEO-3 distributed by Geola in Lithuania. They consistently deliver low-noise, high brightness results.

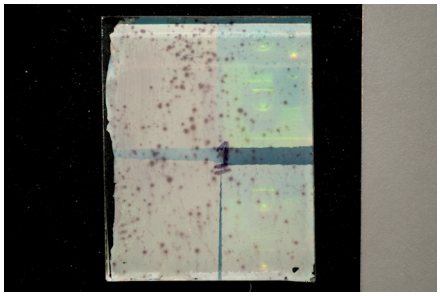
It took many tests, see below, to find the best processing scheme for the GEO-3. The cold water soak before development at reduced temperatures gives super results. For more details, see Fun with Hans and Ed.

Comparable results were obtained with the Gentet Ultimate U08 blue/green plates. What is great about the Gentet system is that he sells the chemistry for the plates, which works incredibly well, probably because he tests these things before shipping them out. The package the plates came in had a hand-written not on the label saying to develop for 4 minutes! That takes the guesswork out of the process!

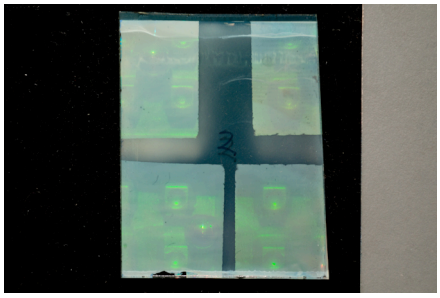
The Colour Holographics BB series of plates are just about as good, but a major issue with them is the pre-exposure sensitizing step. Any time materials are worked on in the darkroom presents a chance that things might get screwed up, like drying marks, dirt, or residual humidity causing the color to go wonky. (See #'s 82 through 85.) If this doesn't present a problem to you, fine, but it is to me. My feeling is you should just take the material out of the box and use it, without pre-exposure steps.

The Harman plates that I sampled were a pre-production batch. I had high hopes for them, as I had met with Harman people, and told them they should try to beat the Colour Holographics materials. But they came out with something like warmed over Agfa 8E75HD or Slavish PFG-01 or Fuji Film. It does an OK job on single beam reflections, but its level of noise, after you've experienced the above emulsions, is borderline acceptable. You can see it in the illustrations. I had better results using classic Pyrochrome or D-19 developer, rather than the brew they recommend.

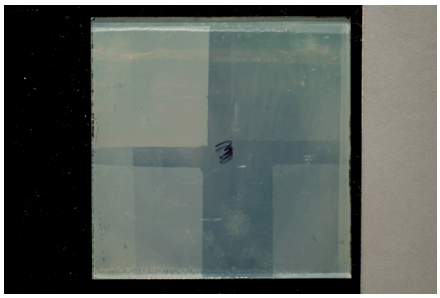
The photos were taken in a standardized set up so that the Kodak Neutral Gray Card, the right border of the image, is pretty much the same brightness in all exposures. You can then tell the relative signal to noise and brightness from these samples. For more details on this analysis technique, check out my paper from ISDH 2012.As far as price and availability of these materials, you are on your own! Good luck in playing with them!



#1: Ilford Red, 5, 10, 20, 40 second exposures, for 200, 400, 800, 1600 μJ/cm^2. 2' Kodak D-8 at 72F, PBQ-2 bleach. Green shifted replay, 200 looked best as higher expos were very noisy, plus undissolved chunks of PBQ left spots all over. Mixed classic Fe EDTA bleach for all the rest of the tests.

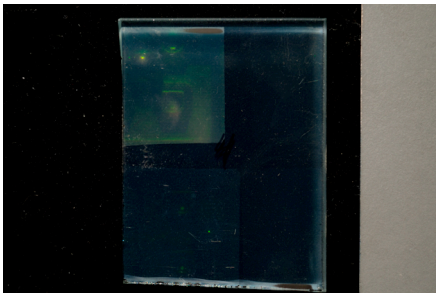


#2: Ilford Red, 50, 100, 200, 400, 5' D-8, green replay, very milky.

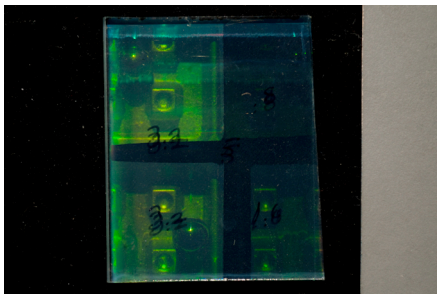


#3: BB640, 50, 100, 200, 400, 5' D-8, no image at all except for highlight on ball bearing in 400. I thought that this was the way I had been doing things previously.

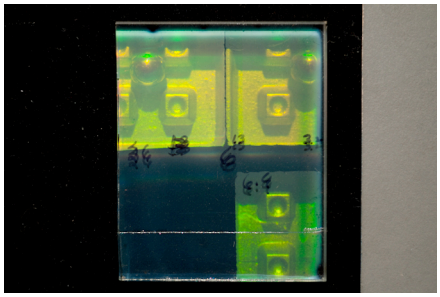
#4: Ilford Red, dropped expos and 32 μJ/cm^2, 5' D-8, only image, so we found the however this was green



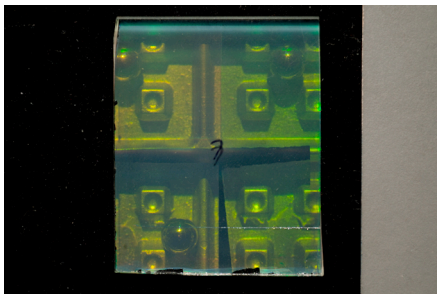
down to 4, 8, 16 the 32 had an threshold, shifted.



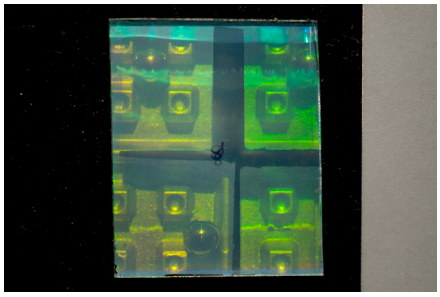
#5: Ilford Red, 32, 64, hiccupped and did 128 μJ/cm^2 twice, screwed up with the blocker card, 1' D-8. The latter seemed to be going in the right direction, although still green.



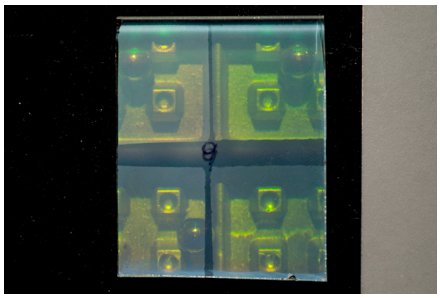
#6: Ilford Red, 125, 250, 500, 1000 µJ/cm^2. The 125 is hidden under a misplaced 500, but the 250, 500 and 1000 are decently bright but noisy and yellowy green.



#7: Ilford Red, 500, 1000, 2000 and 4000 µJ/cm^2, 30” D-8

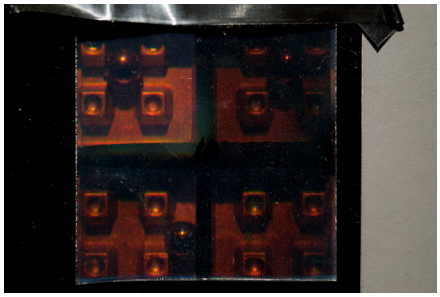


#8: Ilford Red, 500, 1000, 2000 and 4000 µJ/cm^2, 1’ D-8

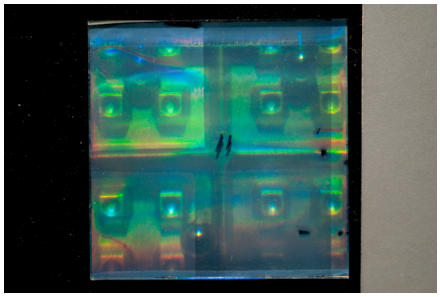


#9: Ilford Red, 500, 1000, 2000 and 4000 µJ/cm^2, 2’ D-8

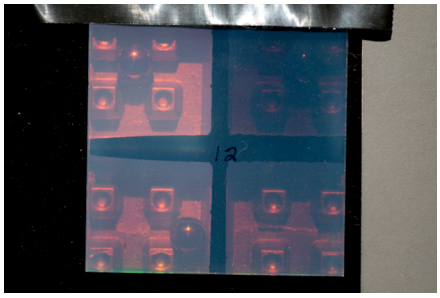
#7 has some images, but none are exceptionally bright. The best one on #8 is the shortest one, 500 µJ/cm^2, which is better than anything on the 2’ developed on, #9, again its best is the shortest. If I were to pick the best expo it would be the 500 on the 1’ development. Or maybe all are over-exposed and over-developed? Might be an avenue to retry.



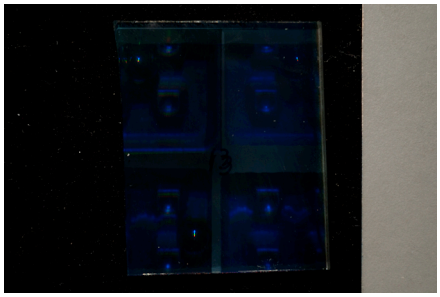
#10 BB-640, 500, 1000, 2000 and 4000 μJ/cm^2, is same expo series, no activation or whatever you want to call it, 1' D-8. The longest expo is the best, not much color shift if at all since I can get real time fringes, decent S/N, but doesn't pop like it should.



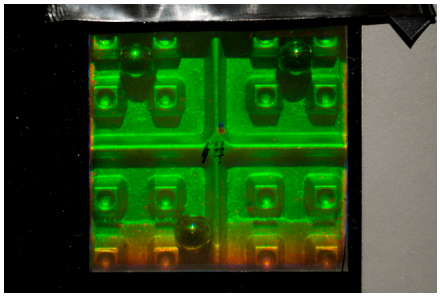
#11: Sphere-S, 500, 1000, 2000 and 4000 μJ/cm^2, 1' D-8. Bright, but not very, color is randomly shifted all over the place, maybe because of handling during a long time drying (like hours).



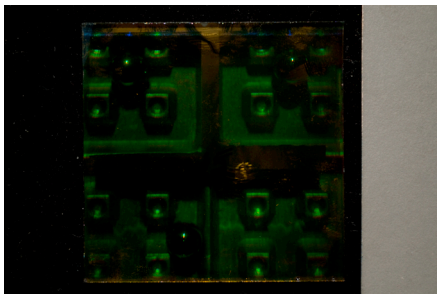
#12: PFG-01, 50, 100, 200, 400 μJ/cm^2. 1' D-8. Looks like you would expect it to, 200 the brightest, 400 about the same brightness but noisier. Also got real time fringes.



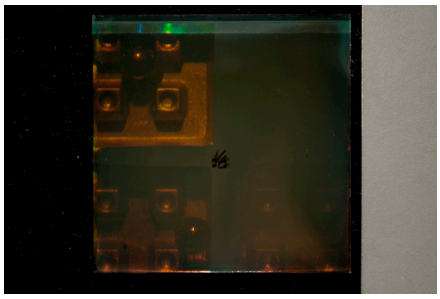
#13: Ilford Red, 500, 1000, 2000, 4000 μJ/cm^2, GP-2 15', dim blue reconstruction.



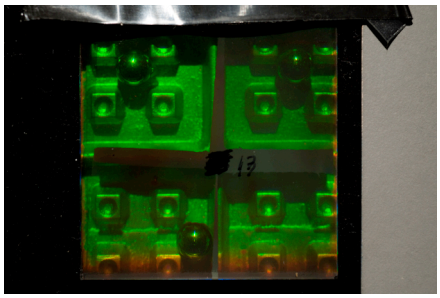
#14: Sphere-S, 500, 1000, quadrant card fell during the 2000 μJ/cm^2 exposure, so this plate in GP-2 15', got an overall exposure of that dosage, and it came out with a very nice and clean image, green however, except at the edges, which may have been caused by leaving it in the rack during drying. Could fixing cause the shrinking?



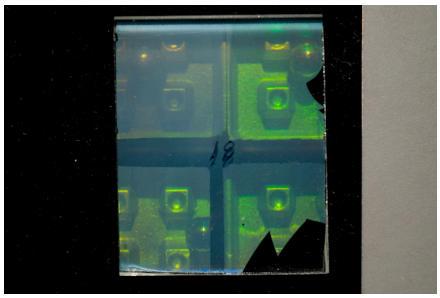
#15: 500, 1000, 2000, 4000 μJ/cm^2, BB-640 activated, GP-2 15', dim green image.



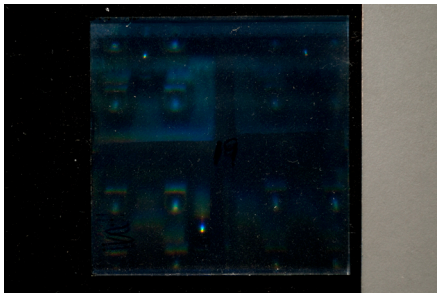
#16: 500, 1000, 2000, 4000 μJ/cm^2, erased PFG-03M, GP-2 15', the longest expo was the only one with a decent image, but it was dim. There was an overall haze, maybe these plates are too old and/or the erasing bath is causing the problem. Also when looking at the emulsion side there is that chirped effect where the replay color is sort of silvery purple for lack of a better word. (Should have photographed this.)



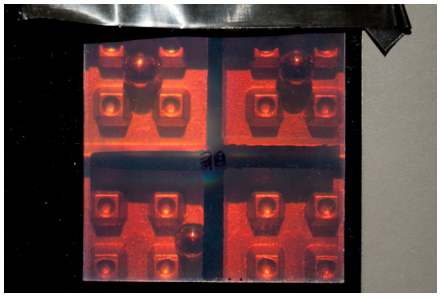
#17: 500, 1000, 2000, 4000 μJ/cm^2, Sphere-S, GP-2 15', expo series properly done this time, nice and bright and low noise, however it was green! Do we need a different fixer that doesn't harden and shrink things? This one also had a different color on the emulsion side.



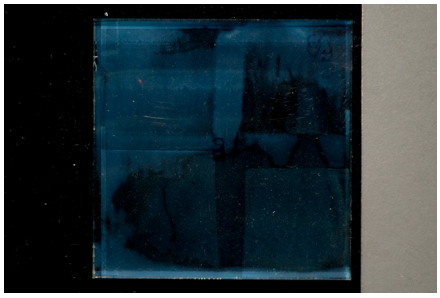
#18: Ilford Red, 500, 1000, 2000, 4000 μJ/cm^2, 1' D-8, 500 was brightest, but a bit noisy, but worst of all, it was green! Coating a little raggedy at edges.



#19: PFG-03M, 500, 1000, 2000, 4000 μJ/cm^2, 1' D-8, dim blue reconstruction, evidently not the way to go with this material, but had to try it!

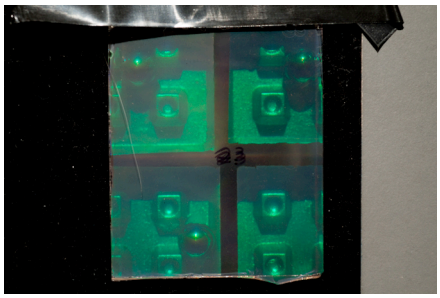


#20: BB-640 activated, 500, 1000, 2000, 4000 μJ/cm^2, 1' D-8, if they all could be like this! Bright, low noise red reconstruction that could yield real-time fringes when replaced onto object holder! Which is a surprise, since I always thought that there was a bit of shrinkage with D-8 and like using the BB pyro developer for perfect wavelength match. But I'm not going to complain much!

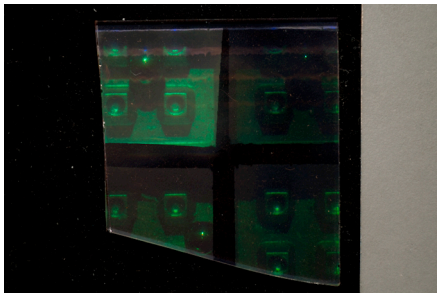


#21: Sphere-S, 500, 1000, 2000, 4000 μJ/cm^2, 1' D-8, took the emulsion clean off!

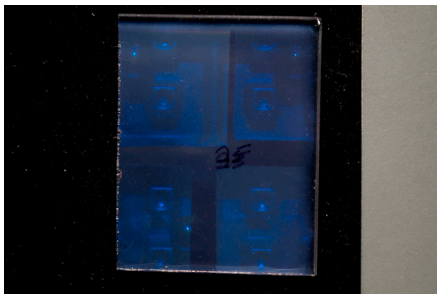
#22: Sphere-S wants 3000 μJ/cm^2 at 515 nm, close enough to what I am shooting at, 532 nm. But forgot to change polarization for the green, so gave two 1500 expos, one right one wrong polarization vector alignment, plus a 3000 and 6000 dose, but it was all moot, since the 1' in D-8 cleaned the emulsion off just like #21! (No picture.)



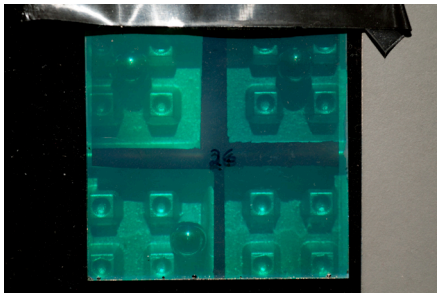
#23: Activated BB-520, 500, 1000, 2000, 4000 μJ/cm^2 at 532 nm, 1' D-8, 500 or 1000 looks great, 500 a little less noisy, laser green replay, only problem is that the sensitizing dye stays behind.



#24: Non-activated BB-520, 500, 1000, 2000, 4000 μJ/cm^2 at 532 nm, 1' D-8, the 4000 is the best, but still not as good as any of the above. Evidently the activator is extremely important.

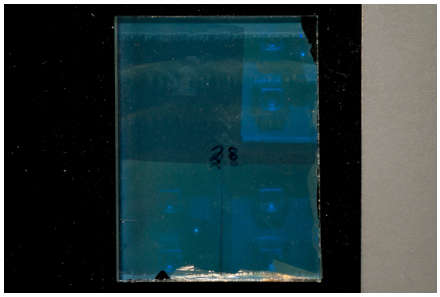


#25: Ilford Green, 500, 1000, 2000, 4000 μJ/cm^2 at 532 nm, 1' D-8, dim blue reconstruction, it too has sensitizing dye residue.



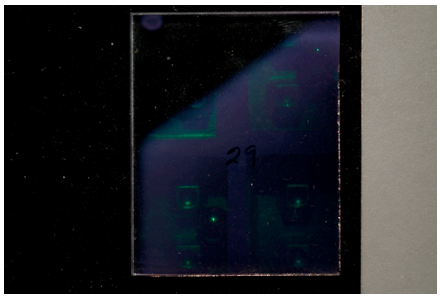
#26: Activated BB-640, 500, 1000, 2000, 4000 μJ/cm^2 at 532 nm, 1' D-8, a twin to #23 except that its brightness peaks at 2000! One or two stops difference, and when you look at their spectral sensitivity/absorption curve it bears that out! This means 5 color holography is possible in my lab! (R, O, Y, G, and K)

#27: Sphere-S, 2000, 4000, 8000 μJ/cm^2, 1' D-8, another D-8 disaster. Oh well! (No picture)

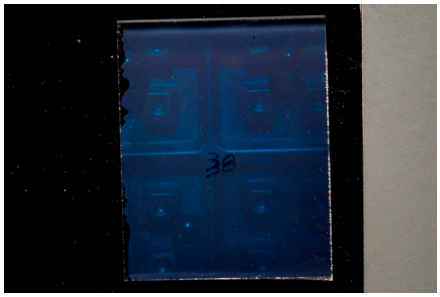


#28: Ilford Red, 3000, 6000, 12000, μJ/cm^2 1' D-8, like #25, a dim blue reconstruction.

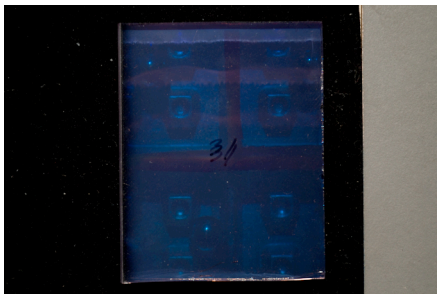
Received word that the LaserSmith was using what he called TJ-1, a metol/ascorbine brew, actually an old BB or Jeff Blyth formulation. I didn't want to mix that up right away, since I had some SM-6 mixed up which had been recommended to me by Stas at Geola for the Sphere-S plates, so I tried that on the following.



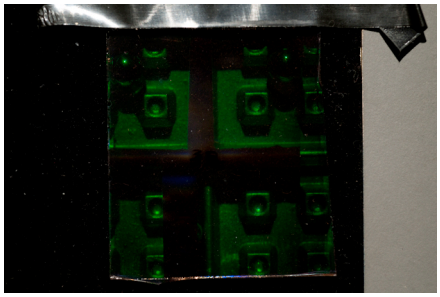
#29: If there was a big improvement for BB plates by activating them in Photo-Flo, why wouldn't the Ilford products benefit? 500, 1000, 2000, 4000 μJ/cm^2 at 532 nm, 1' in SM-6. Dim green reconstruction, plus coating edge.



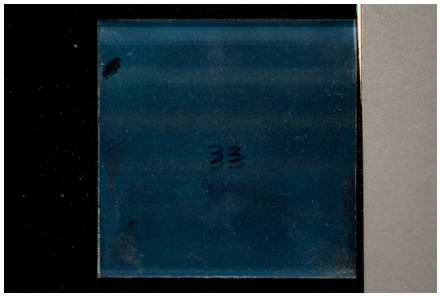
#30: Ilford Green, non-activated, 500, 1000, but quadrant blocker fell off during 2000 μJ/cm^2 at 532 nm so there is an overall expo, 1' in SM-6. Dim blue reconstruction.



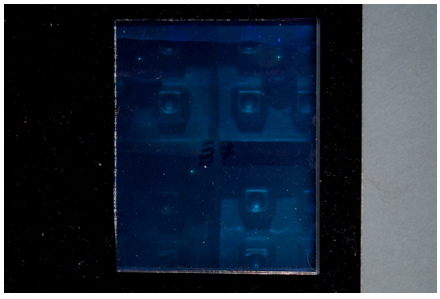
#31: Ilford Green, non-activated, 500, 1000, 2000, 4000 μJ/cm^2 @ 532 nm, 1' in SM-6, dim blue reconstruction.



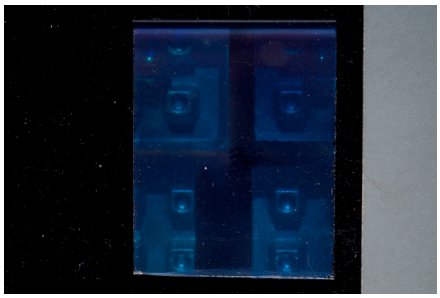
#32: Activated BB-520, 500, 1000, 2000, 4000 μJ/cm^2 at 532 nm, 1' in SM-6, not as bright as #24, with a different green color, but it is less noisy. I was always convinced (since I am the discoverer of SM-6) that it is not suitable for CW holography, only pulsed.



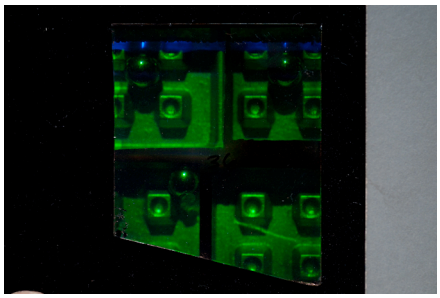
#33: Sphere-S, 500, 1000, 2000, 4000 μJ/cm^2 at 532 nm, 1' in SM-6. Stas recommended this developer for this material, however the plate was totally blank. The emulsion didn't come off this time, it was just blank. Maybe it was totally over-developed?



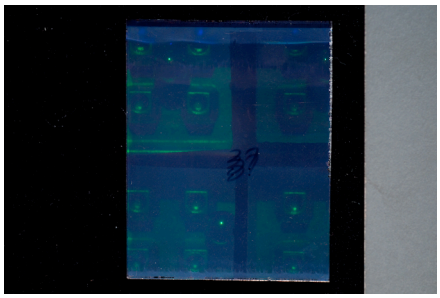
#34: Ilford Green, 64, 125, 250, 500 μJ/cm^2. 1' BBAA, dim blue reconstruction, something went wrong on the 250 exposure, but still not good overall.



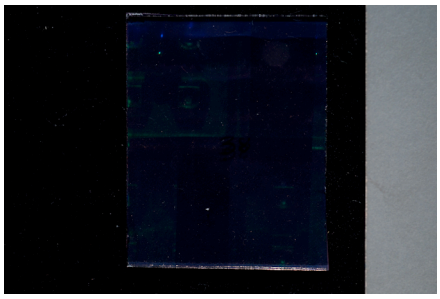
#35, Ilford Green, 500, 1000, 2000, 4000 μJ/cm^2, 1' BBAA, better exposures, but still dim blue reconstruction.



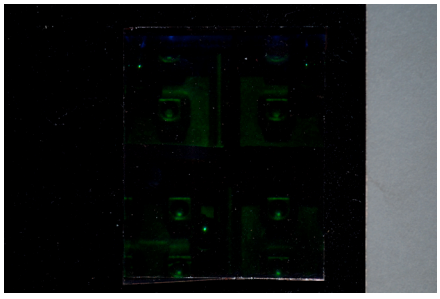
#36, BB520, 250, 500, 1000, 2000, μJ/cm^2, 1' BBAA, nice, solid laser green replay.



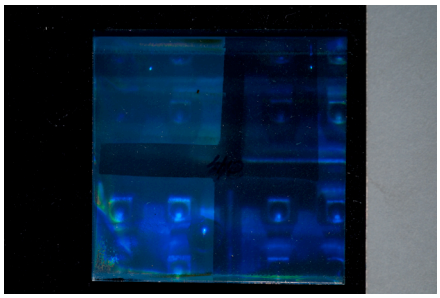
#37: Ilford Green, maybe these plates were fogged in shipping, (Rick B said maybe something happened to my stuff), used the eraser formula on it, 250, 500, 1000, 2000, μJ/cm^2, 1' BBAA, same as above.



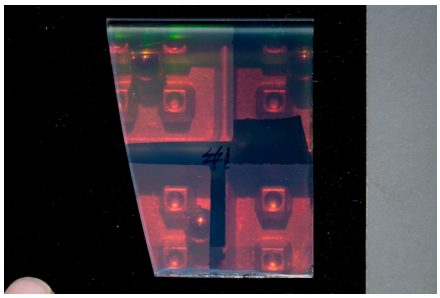
#38: Ilford Green, 250, 500, 1000, 2000 μJ/cm^2, 1' LN-7, dim, but green.



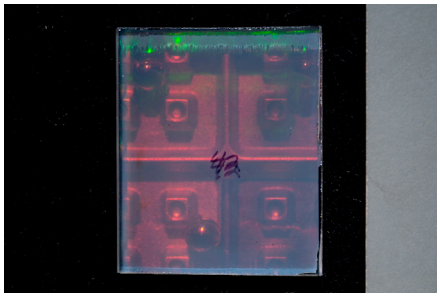
#39: BB520, 250, 500, 1000, 2000 μJ/cm^2, 1' LN-7, dim but green. This might not be an appropriate development time, as there is that 30" induction period. Next time with this developer should go at least 2', maybe more.



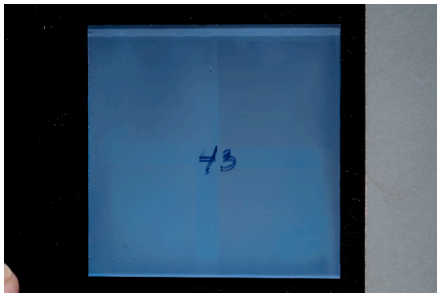
#40: Sphere-S, 500, 1000, 2000, 4000 µJ/cm^2, something happened, 1’ LN-7, blue replay, but the 2000 looked decently bright, however as usual the plate was splotchy with weird colors.



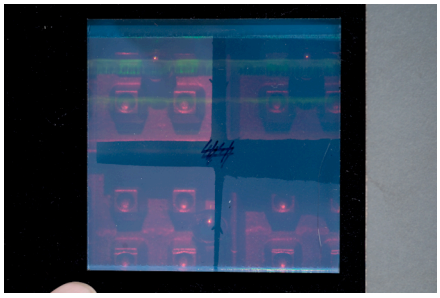
#41: Ilford Red, erased, 50, 100, 200, 400 µJ/cm^2, 1’ BBAA, now we’re getting somewhere! Looks decent!



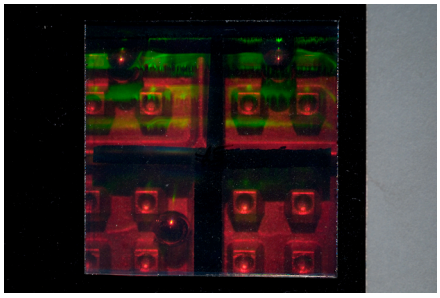
#42: Ilford Red, (erased or not?), attempted 400, 800, 1600, 3200 µJ/cm^2 but card fell off during 1600 expo so it is very well-overexposed overall with some funny interference fringe things going on in the two double-exposed quarters. But the image is better than many other Ilford Reds!



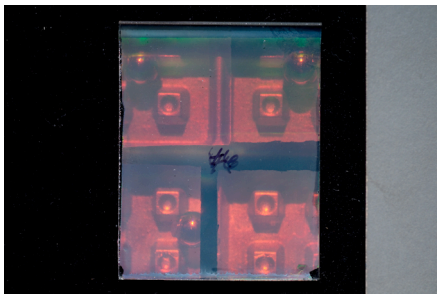
#43: Agfa 8E75HD, 50, 100, 200, 400 µJ/cm^2, 1’ BBAA, overexposed or fogged to a creamy overall white, useless.



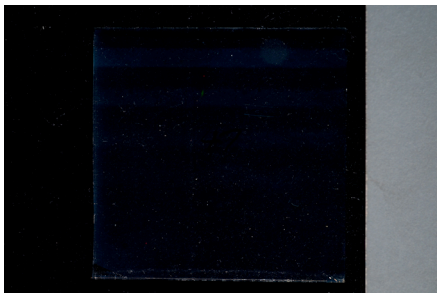
#44: Slavich PFG-01, 50, 100, 200, 400 µJ/cm^2, 1’ BBAA, looks fogged but an image is still there.



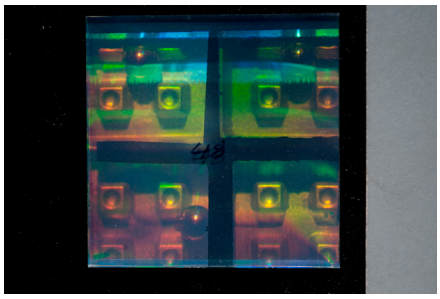
#45: BB-640, activated last week, my last pre-cut 2 ½" square (boo-hoo!) 400, 800, 1600, 3200 μJ/cm^2, 1' BBAA, nice and bright and low-noise, a deeper red than #20 which looks orangey in comparison (D-8 developer), but still great.



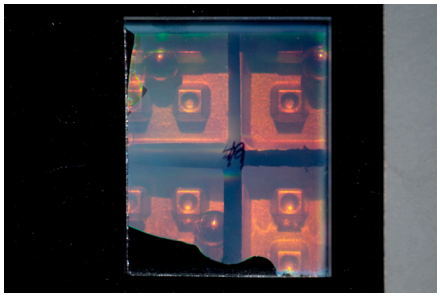
#46: Ilford Red, 100, 200, 400, 800 μJ/cm^2, 1' BBAA, 200 looks best, but noisy, are these plates really fogged, I don't think that this one got the Eraser treatment. Looks not unlike what I would have expected the 8E75HD to be like.



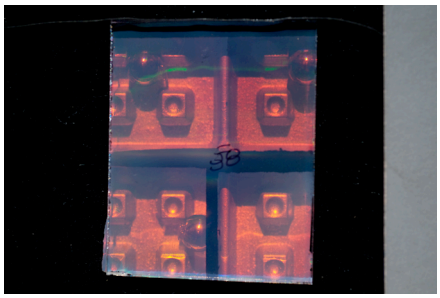
#47: PFG-03M, 200, 400, 800, 1600 μJ/cm^2, 1'BBAA, totally blank. Must really need the low alkalinity of the GP-2.



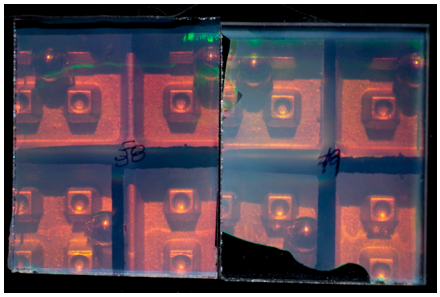
#48: Sphere-S, 400, 800, 1600, 3200 μJ/cm^2, 1'BBAA, some places a decent red replay, others green, but it is not a function of exposure, either drying or coating. Does this stuff need a dunk in a hardener or what?



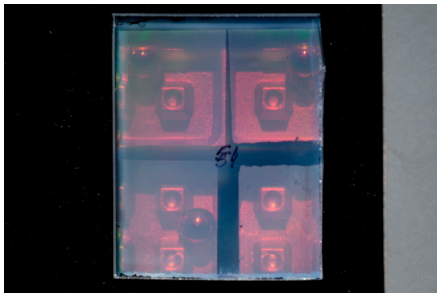
#49: Ilford Red, out of the box, 100, 400, 200, 800 μJ/cm^2, 1' BBAA. This was a comparison to see if the batch had been fogged.



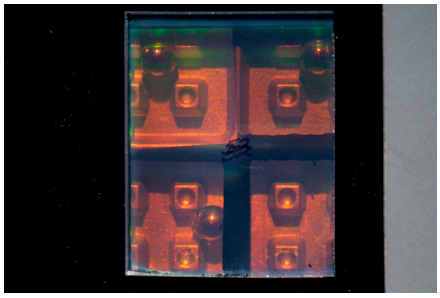
#50: Ilford Red, erased, 100, 200, 400, 800 μJ/cm^2, 1' BBAA. This was a comparison to see if the batch had been fogged, and compared to the above, it was!



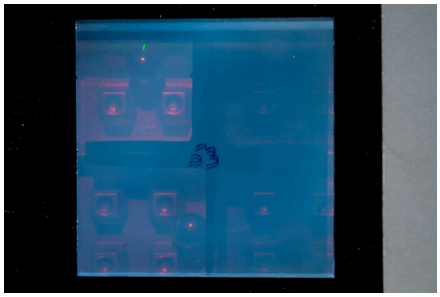
#50 side by side with #49, both having had the same exposure series, developed simultaneously for 1' in BBAA, with #50 on the left having been erased, #49 showing the effects of some degree of fog level.



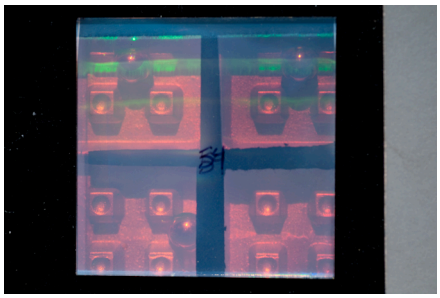
#51: Ilford Red, erased, 100, 200, 400, 800 μJ/cm^2, 2' BBAA. This might be very over-developed! Bright but milky.



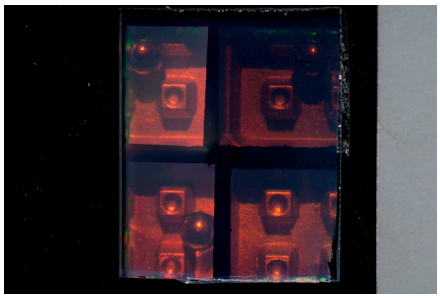
#52: Ilford Red, erased, 100, 200, 400, 800 μJ/cm^2, 30" BBAA. This just might be the way to to compete with BB-640!



#53: Agfa 8E75HD, erased, 50, 100, 200, 400 μJ/cm^2, 30” BBAA, some dim noisy images, but maybe it seems that this is not a good developer for this material.



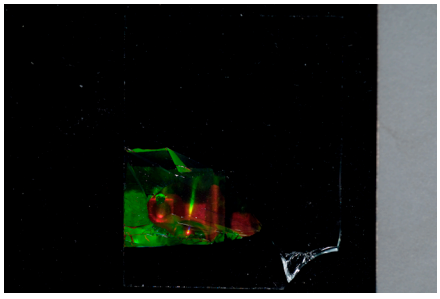
#54: Slavich PFG-01, erased, 50, 100, 200, 400 μJ/cm^2, 30” BBAA, better looking than the above, again this might not be the optimum developer for this material.



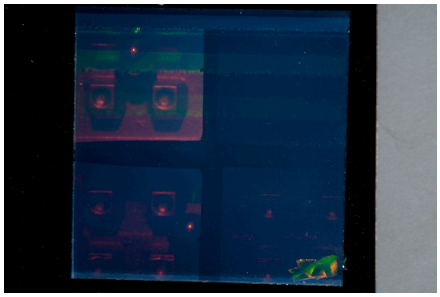
#55: Ilford Red, 100, 200, 400, 800 μJ/cm^2, 4’ LN-7, One of the better examples on this material!

#56: BB-640, 200, 400, 800, 1600 μJ/cm^2, 4’ LN-7, was using this one to judge progress of development by eye, which is why we ended up with the eternally long 4’ in the series above; however, the emulsion came off the glass in the bleach! No picture.

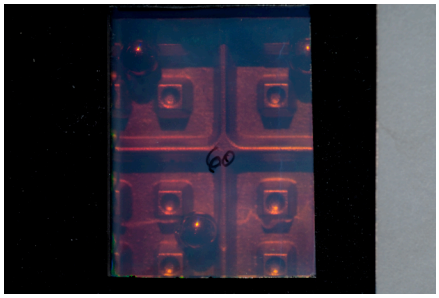
#57: Agfa 8E75HD, 200, 400, 800 μJ/cm^2, 4’ LN-7, very milky, over developed? This one had been “erased”, but maybe not enough.



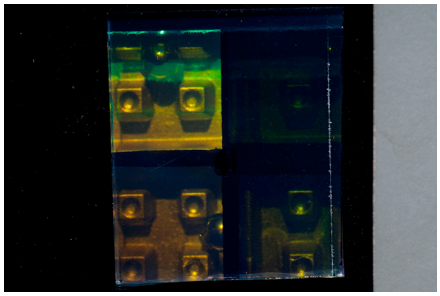
#58: BB-640, 400, 800, 1600, 3200 μJ/cm^2, 2’ LN-7, The emulsion came off the glass in the bleach again, but managed to save some of it. Kinda looks cool, might have been the brightest in the bunch if it had stuck on!



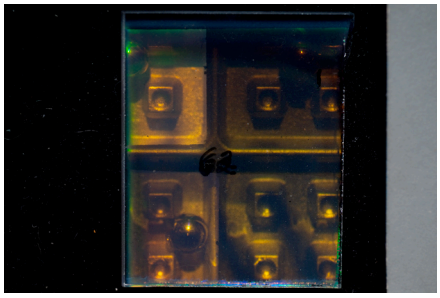
#59: PFG-01, 50, 100, 200, 400 μJ/cm^2, 2' LN-7, is it fog or just other bad things? Notice the piece of BB-640 emulsion that floated off its glass and attached itself to this one in the lower right corner.



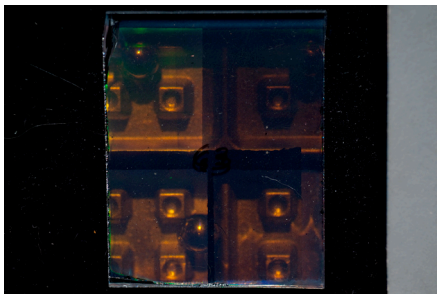
#60: Ilford Red, 100, 200 μJ/cm^2, mixed something up so that the left half of the plate got a 1600 μJ/cm^2 exposure dose. 2' LN-7. Might be overdone.



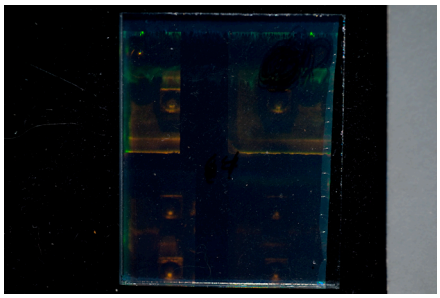
#61: Ilford Red, 100, 200, 400, 800 μJ/cm^2, 2' LN-7, 800 looks really bright and the noise is lower than what we've been seeing, however the color is very green shifted!



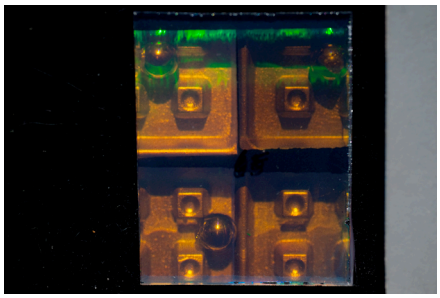
#62: Ilford Red, 200, 400, 800, 1600 μJ/cm^2, 4' LN-7. The best one of the series, 1600 best expo. Orange replay. If I were to use this developer again I'd go with 5'.



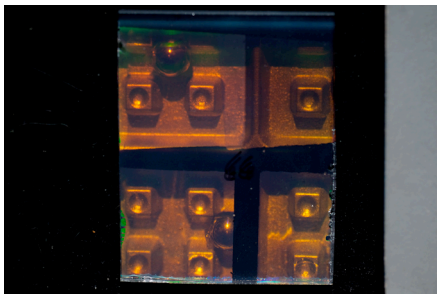
#63: Ilford Red, 200, 400, 800, 1600 μJ/cm^2, 2' LN-7. 1600 almost usable.



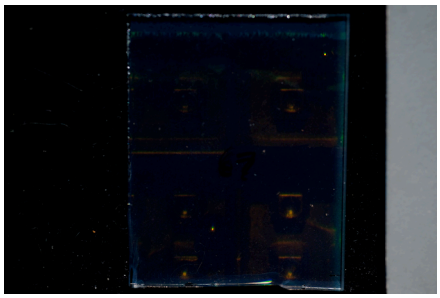
#64: Ilford Red, 400, 800, 1600, 3200 μJ/cm^2, 1’ LN-7. Not long enough time, even with 3200 expo.



#65: Ilford Red, 200, 400, 800, 1600 μJ/cm^2, 2’ CWC2. OK, but yellowy.

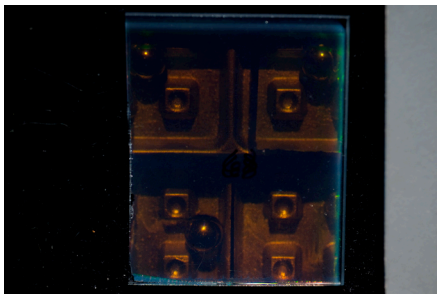


#66: Ilford Red, 200, 400, 800, 1600 μJ/cm^2, 4’ CWC2. 1600 usable, but yellowy.

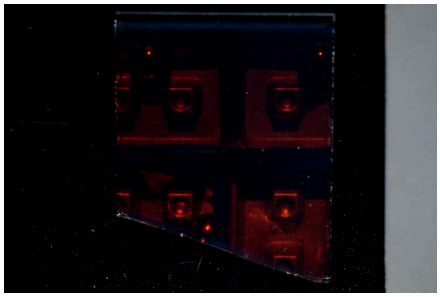


#67: Ilford Red, 200, 400, 800, 1600 μJ/cm^2, 1’ CWC2. Not usable.

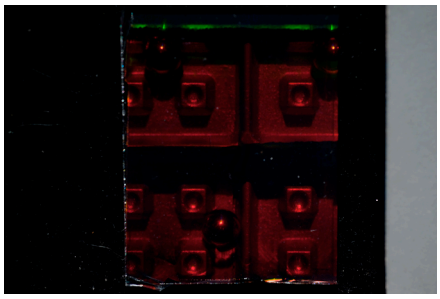
#68: Ilford Red, 200, 400, 800, 1600 μJ/cm^2, 30” CWC2. Totally unusable, however it was decidedly a colloidal development when yanked. Maybe don’t bleach it next time.



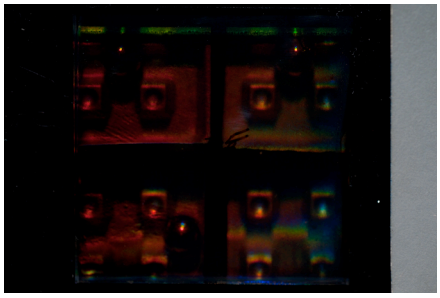
#69: Ilford Red, 200, 400, 800, 1600 μJ/cm^2, 1’ BB-Pyro. Definitely underdeveloped.



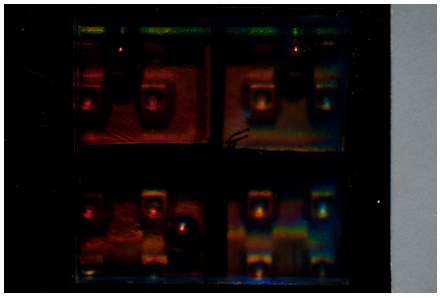
#70: Ilford Red, 200, 400, 800, 1600 μJ/cm^2, 2’ BB-Pyro. Deep red. Somewhat OK in the brightness department.



#71: Ilford Red, 200, 400, 800, 1600 μJ/cm^2, 4’ BB-Pyro. 400 or 800 would be usable, but as with all the above, the color is shifted to a much deeper red than He-Ne. Next time I would use this developer I would go with 5’ immersion

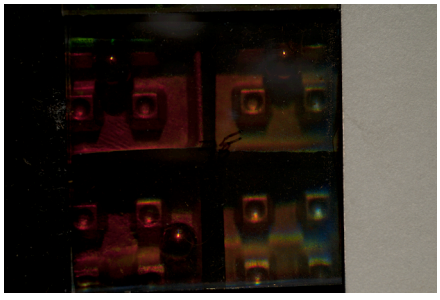


#72: Sphere-S, 400, 800, 1600, 3200 μJ/cm^2, 5’ BB Pyro. Looked almost completely black in developer, bleached easily however, and gave a red replay, although there is of course a chirp at the bottom edge of drying.

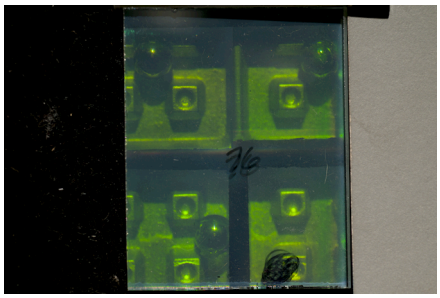


#73: Sphere-S, 400, 800, 1600, 3200 μJ/cm^2, 5’ BB Pyro. Looked almost completely black in developer, bleached easily however, and gave a red replay, although there is of course a chirp at the bottom edge of drying.

#73: Fog test #74: Fog test

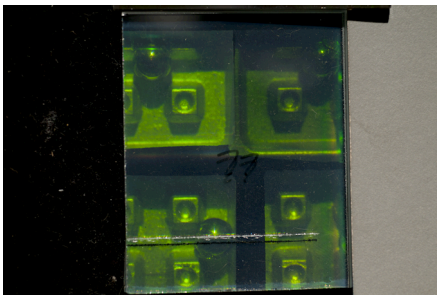


#75: Sphere-S, 400, 800, 1600, 3200 uJ/cm2 at 633 nm, 5’ BB Pyro. More red than anything, however the color could be anything, as there are weird drying marks all over. It was dried in a Combi rack, might be the problem.

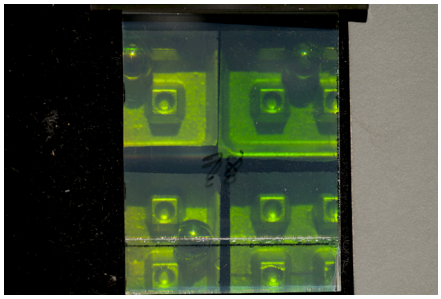


#76: Harman Red, 200, 400, 800, 1600 uJ/cm^2 at 633 nm, 30” BBAA

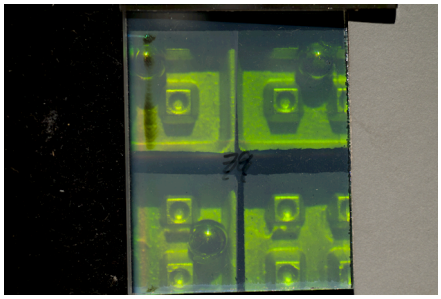
#77: Harman Red, 800, 6400 uJ/cm^2 at 633 nm, 30”



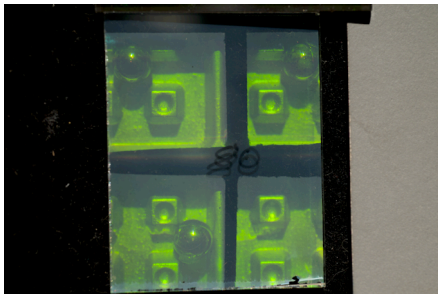
1600, 3200, BBAA



#78: Harman Red, 200, 400, 800, 1600 uJ/cm^2 at 633 nm, 1’ BBAA



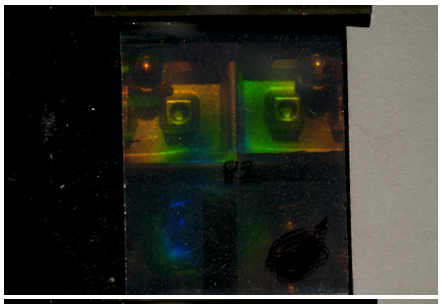
#79: Harman Red, 200, 400, 800, 1600 uJ/cm^2 at 633 nm, 2’ BBAA



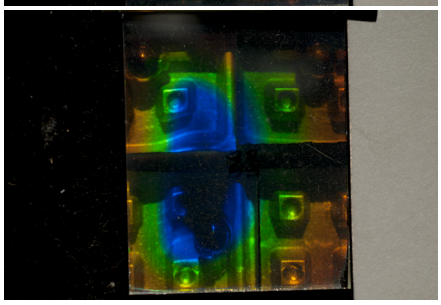
#80: Harman Red, 200, 400, 800, 1600 uJ/cm^2 at 633 nm, 4’ BBAA

All the above were developed at 75 degrees F. The OC safelight was one while they were getting loaded into the racks pre-developer, but didn’t seem to make a difference (or did it) they were all green, and the noise was of course there. If I were to pick the “most solid” (subjective brightness compared to noise) I would go with the longest at 1’ dev. Actually almost all expo and dev combos gave a decent image, if you were looking for color shifted to green.

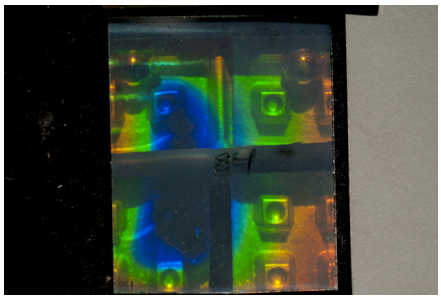
#81: BB-640, 200, 400, 800, 1600 uJ/cm^2 at 633 nm, 30” BBAA. MIA



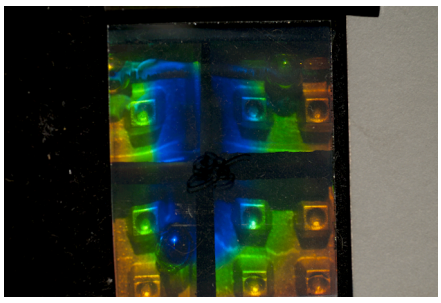
#82: BB-640, 800, 1600, 3200, 6400 uJ/cm^2 at 633 nm, 30” BBAA.



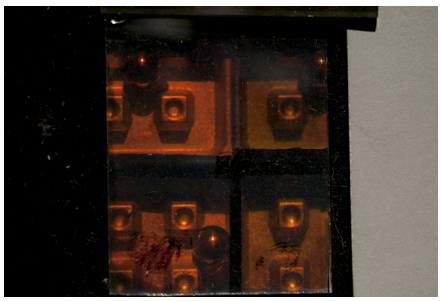
#83: BB-640, 200, 400, 800, 1600 uJ/cm^2 at 633 nm, 1’ BBAA.



#84: BB-640, 200, 400, 800, 1600 uJ/cm^2 at 633 nm, 2’ BBAA.



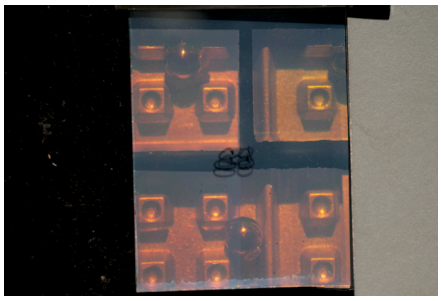
#85: BB-640, 200, 400, 800, 1600 uJ/cm^2 at 633 nm, 4’ BBAA.



#86: BB-640 from Colour Holographics, 200, 400, 800, 1600 uJ/cm^2 at 633 nm, 4' BBAA.

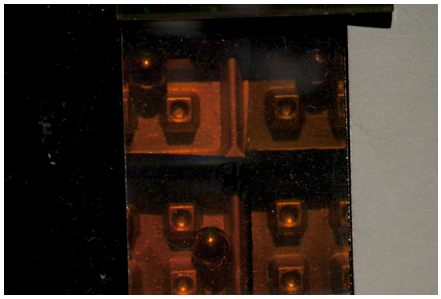
#81 is MIA at the moment. #'s 82-85 illustrate the danger of the dreaded activation step; if the plates are not completely dry, then there is uneven swelling, viz. the blue into black zones in the middle of the plates. #86 is from the Colour Holographics batch of BB-640 plates, and it was activated at the same time as the others, and dried quicker. The longest expo was the best, next time I would like to go with 5' development to gain some speed.

#87: Harman Red, 200, 400, 800, 1600 uJ/cm^2 at 633 nm, 1' BBAA, TJ dichromate bleach.

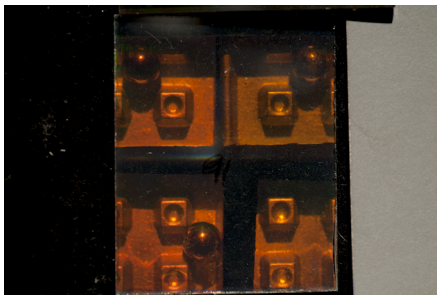


#88: Harman Red, 200, 400, 800, 1600 uJ/cm^2 at 633 nm, 2' BBAA, TJ dichromate bleach.

This might be the answer to the shrinkage! Instead of an organic tanning oxidizer, why not dichromate! And it seems to keep the color at the red!

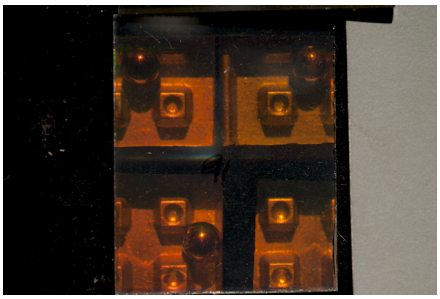


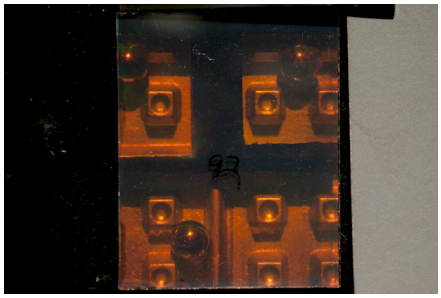
#89: BB-640, 400, 800, 1600, 3200 uJ/cm^2 at 633 nm, 30" BBAA.



#90: BB-640, 400, 800, 1600, 3200 uJ/cm^2 at 633 nm, 1' BBAA.

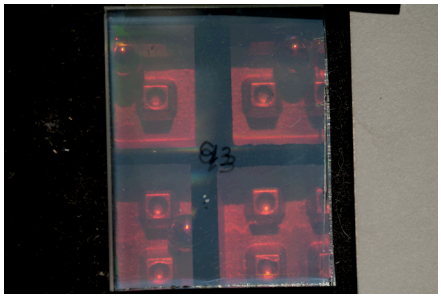
#91: BB-640, 400, 800, 1600, 3200 uJ/cm^2 at 633 nm, 2' BBAA.





#92: BB-640, 400, 800, 1600, 3200 uJ/cm^2 at 633 nm, 4' BBAA.

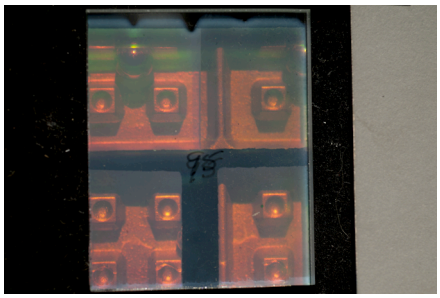
These were bleached with the usual Fe EDTA, look great! Although compared to the original batch of plates for the 2000 Consumer's Report, which were bleached with PBQ…



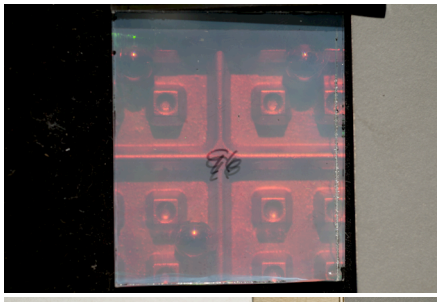
#93: Harman Red, 200, 400, 800, 1600 uJ/cm^2 at 633 nm, 1' BBAA

#94: Harman Red, 200, 400, 800, 1600 uJ/cm^2 at 633 nm, 2' BBAA

Dropped the KBr concentration on these two down to 15 g/L, but they were noisier and deeper red!



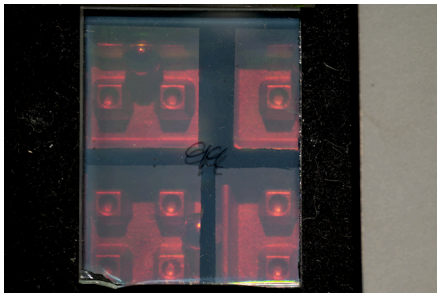
#95: Harman Red, 200, 400, 800, 1600 uJ/cm^2 at 633 nm, 2' BBAA, 15g/L KBr bleach, nice red replay, but foggy.



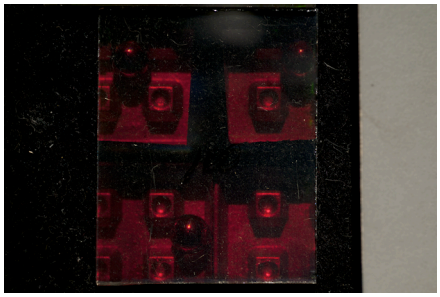
#96: Harman Red, erased, 800 uJ/cm^2 overall, 2' BBAA, same bleach as above, and real milky. Fogged?

#97: Random chunk of plate, developed for 2', got a nasty positive on the fog test!

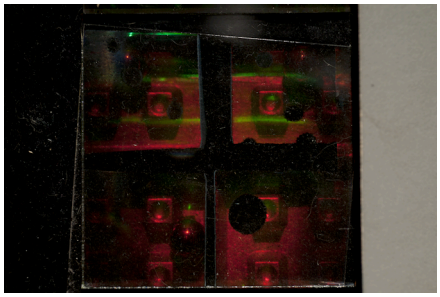
#98: From same box as above, not developed but fixed with above.



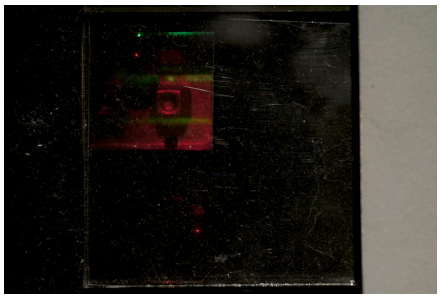
#99: Harman Red, 200, 400, 800, 1600 uJ/cm^2 at 633 nm, 2' BBAA, 15g/L, looks foggy still, is this Jeff's eraser formula working?



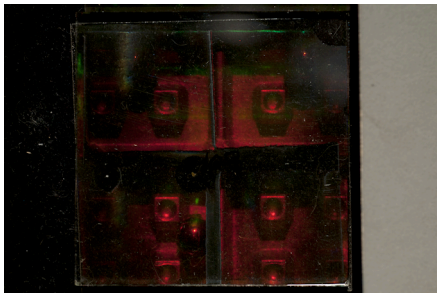
#100: BB-640, 400, 800, 1600 3200 uJ/cm^2 at 633 nm, 2' BBAA, 15 g/L, color looks upshifted.



#101: Bayer PhotoPolymer, 18, 36, 72, 144 mJ/cm^2 at 633 nm, all looked the same.

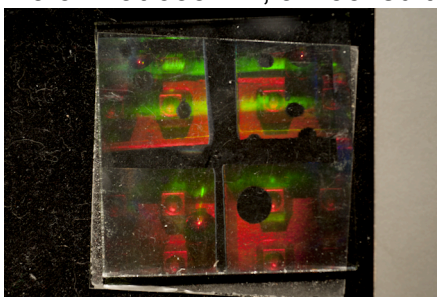


#102: Bayer PhotoPolymer, 2.25, 4.5, 9, 18 mJ/cm^2 at 633 nm, 18 looked the same as on the one above, and the lower doses were blank. 18 must be the threshold.

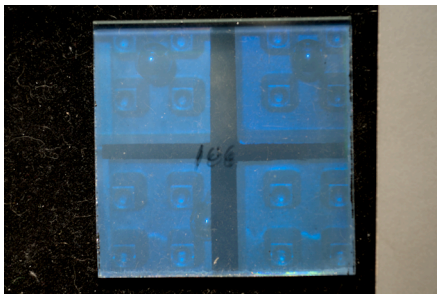


#103: Bayer PhotoPolymer, 72, 144, 288, 576 mJ/cm^2 at 633 nm, all looked the same as far as image went, but the longest one (which was 24'!) was totally polymerized, as it was clear when taken off the object while the others had some density.

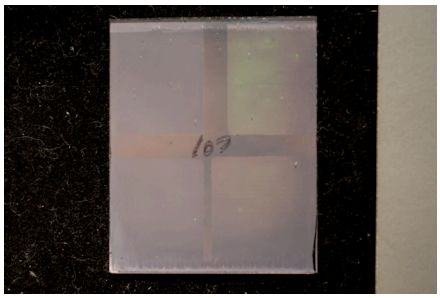
#104: Bayer PhotoPolymer, forgot expos doses in the log book, 18, 36, 72, 144 mJ/cm^2 at 633 nm, all looked the same. MIA at the moment.



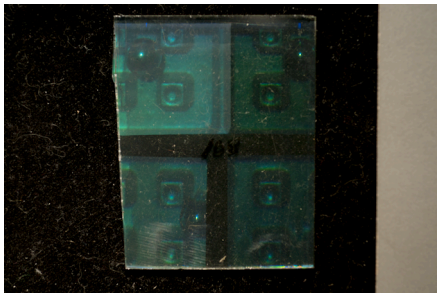
#105: Bayer PhotoPolymer, forgot expos dose in the log book, probably exposed until clear, but laminated so that polymer was under glass, so glass wouldn't mess with the object beam. Some black bubbles from dirt.



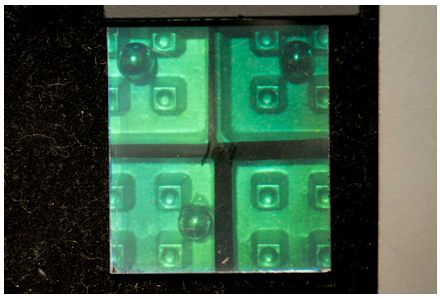
#106: Harman Green, 400, 800, 1600, 3200 uJ/cm^2 at 532 nm, 2' D-8 @ 75F, TJ Bleach. Dim, foggy, and shifted to blue.



#107: BB-520, 400, 800, 1600, 3200 uJ/cm^2 at 532 nm, 2' D-8 @ 75F, TJ Bleach. Dim, foggy, but not shifted to blue. Either plate was fogged or there was too much exposure and development, might have been better with 1' D-8. But the old BB-640 loved D-8 at 5 minutes!

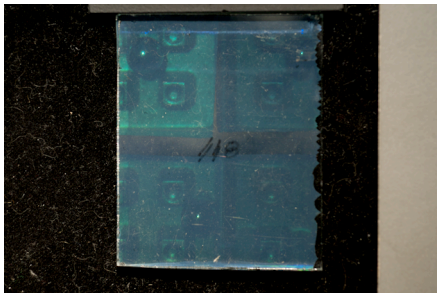


#108: BB-520, 800, 1600, 3200, 6400 uJ/cm^2 at 532 nm, 1' D-8 @ 75F, TJ Bleach.

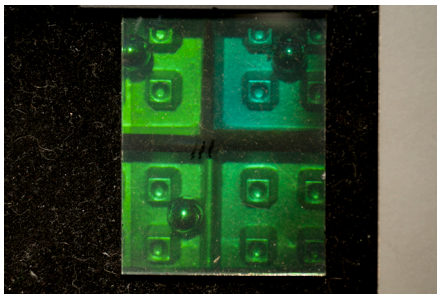


#109: BB-520, 800, 1600, 3200, 6400 uJ/cm^2 at 532 nm, 5' D-8 @ 75F, TJ Bleach.

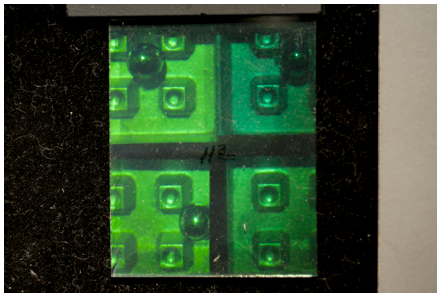
I don't know where those dopes at Colour Holographics get off with this < 1 minute developing time. The 5' development is infinitely better. This should be the standard developing time from now on for this material.



#110: Harman Green, 800, 1600, 3200, 6400 uJ/cm^2 at 532 nm, 1' D-8 @ 75F, TJ Bleach. The 6400 is the only one with a viewable image, which is blue-shifted and noisy.

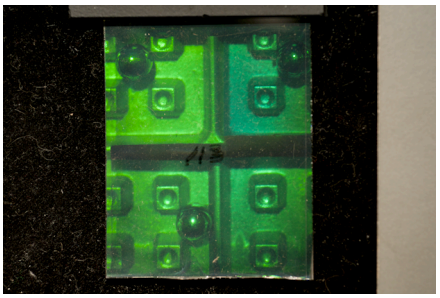


#111: BB-520, 3200, 6400, 12,800, 25,600 uJ/cm^2 at 532 nm, 30" BBAA @ 75F, TJ Bleach.

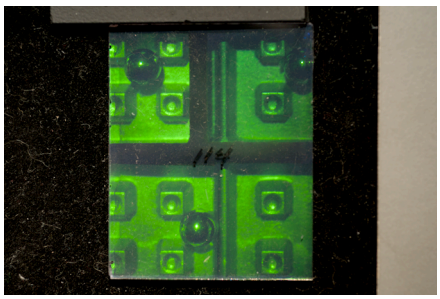


#112: BB-520, 3200, 6400, 12,800, 25,600 uJ/cm^2 at 532 nm, 1' BBAA @ 75F, TJ Bleach.

#113: BB-520, 3200, 6400, uJ/cm^2 at 532 nm, 2' BBAA @

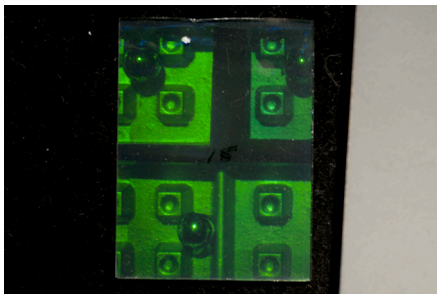


12,800, 25,600 75F, TJ Bleach.

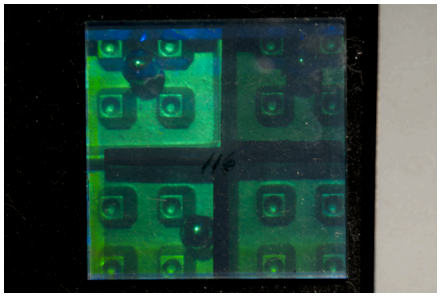


#114: BB-520, 3200, 6400, 12,800, 25,600 uJ/cm^2 at 532 nm, 5' BBAA @ 75F, TJ Bleach.

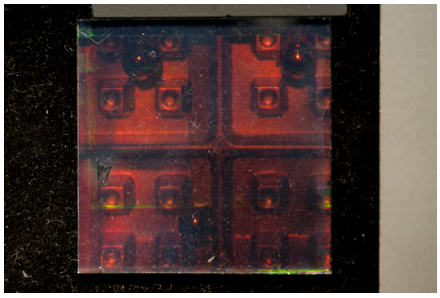
Nice series to prove that longer development times are the way to go! However, the 5' BBAA is not as solid as the 5' D-8!



#115: BB-520, 3200, 6400, 12,800, 25,600 uJ/cm^2 at 532 nm, 2' JD-4 @ 75F, TJ Bleach. To see is there was any difference between the BBAA and TJ or JD-4 recipes. MIA 4/22/12.

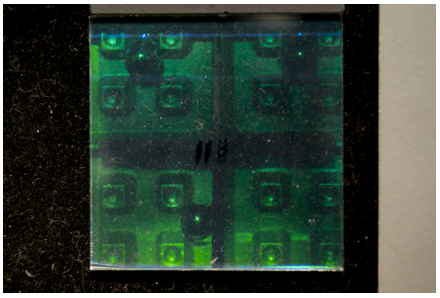


#116: GEO-3, 800, 1600, 3200, 6400 uJ/cm^2 at 532 nm, 15" JD-4 @ 65F, TJ Bleach. First one done with the TJ cold method, and works great!

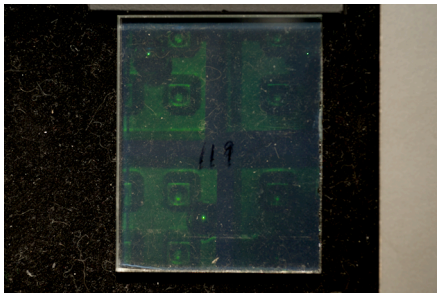


#117: PFG-03M, 800, 1600, 3200, 6400 uJ/cm^2 at 633 nm, 15" JD-4 @ 65F, TJ Bleach. First one done with the TJ cold method, and might work great, but there is some sort of dim fringe/movement thing going on that confounds the conclusion.

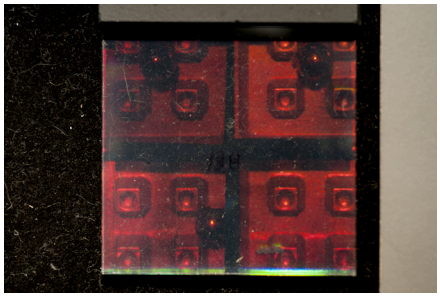
#118: GE0-3, 3200, 6400, uJ/cm^2 at 532 nm, 15" JD-4 Bleach.



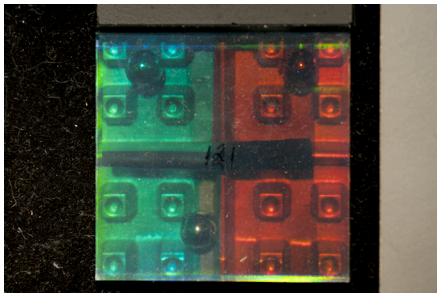
12,800, 25,600 @ 65F, TJ



#119: Harman Green, 1600, 3200, 6400, 12,800, uJ/cm^2 at 532 nm, 15" JD-4 @ 65F, TJ Bleach.

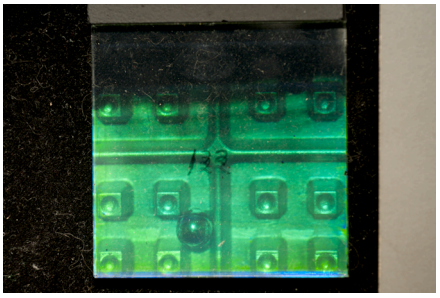


#120: GE0-3, 3200, 6400, 12,800, 25,600 uJ/cm^2 at 633 nm, 15” JD-4 @ 65F, TJ Bleach.

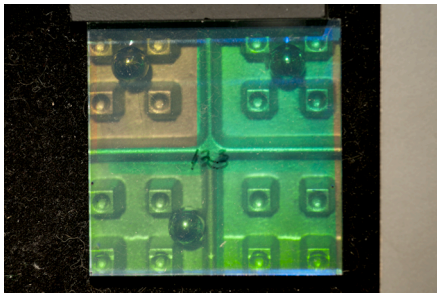


#121: GE0-3, 6400, 12,800 uJ/cm^2 at 532 nm, plus 3200, 6400 uJ/cm^2 at 633 nm, 15” JD-4 @ 65F, TJ Bleach. Neither the green nor red exposures were as good as previous. Is it movement? Looking back, turns out 15” was not a good immersion time, 30” became the norm.

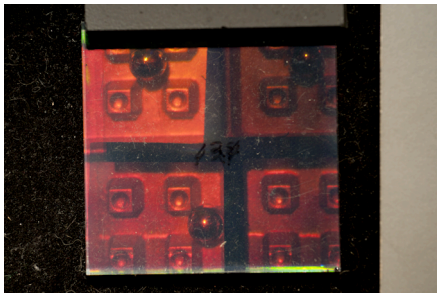
#122: GEO-3, overall 6400 nm, slowly dropped into increments, decided 30” the standard developing time.



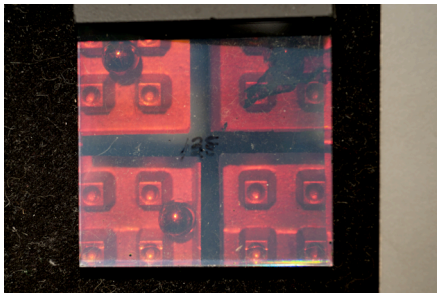
uJ/cm^2 at 532 beaker with 15” would become



#123: GEO-3, overall 4500 uJ/cm^2 at 532 nm, plus 800, 1600, 3200, 6400 uJ/cm^2 at 633 nm. The base plus 3200 is almost neutral, base plus 6400 orange, but no yellow.

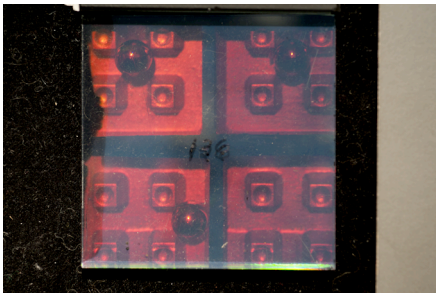


#124: GEO-3, 800, 1600, 3200, 6400 uJ/cm^2 at 633 nm, 30” JD-4 @ 65F, TJ Bleach.

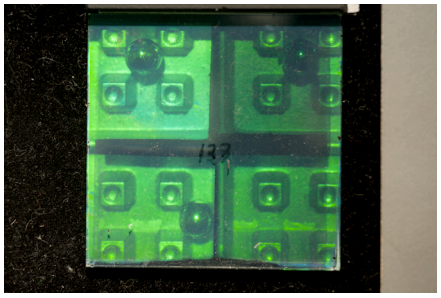


#125: GEO-3, 800, 1600, 3200, 6400 uJ/cm^2 at 633 nm, 1’ JD-4 @ 65F, TJ Bleach.

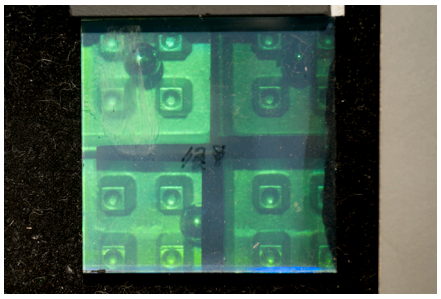
#126: GEO-3, 800, 1600, 3200, 6400 uJ/cm^2 at 633 nm, 2’ JD-4 @ 65F, TJ Bleach.



This trio demonstrates that this is truly the best processing scheme for this material, and there is no need to go with longer times, as the brightness doesn’t increase substantially, and you can see the noise pick up.

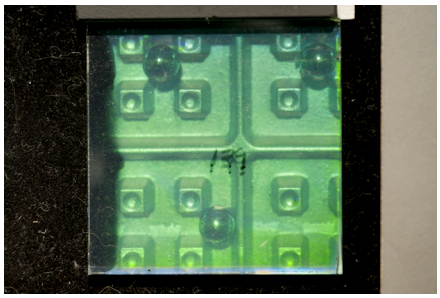


#127: GEO-3, 800, 1600, 3200, 6400 uJ/cm^2 at 532 nm, 1' JD-4 @ 65F, TJ Bleach.

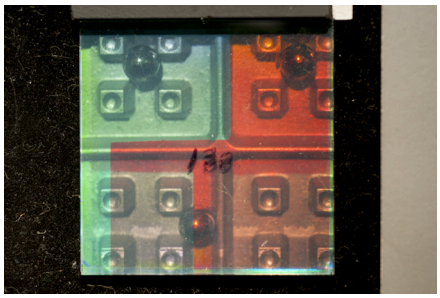


#128: GEO-3, 800, 1600, 3200, 6400 uJ/cm^2 at 532 nm, 2' JD-4 @ 65F, TJ Bleach.

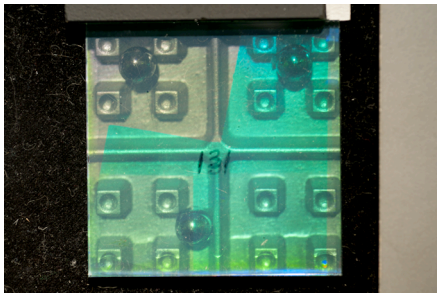
These two, along with #116, show once again this cold short processing works, even at 532 nm! (#116 is only 15" development, don't have a 30" for fair comparison yet.)



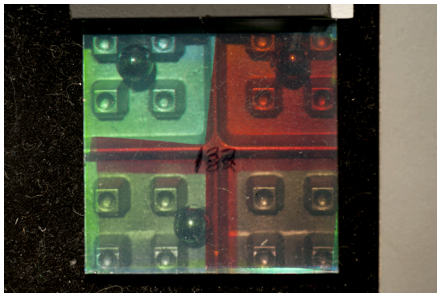
#129: GEO-3, 6000 uJ/cm^2 at 532 nm and 3000 uJ/cm^2 at 633 nm simultaneously, 30" JD-4 @ 65F, TJ Bleach. Greenish, not yellowy or orangey.



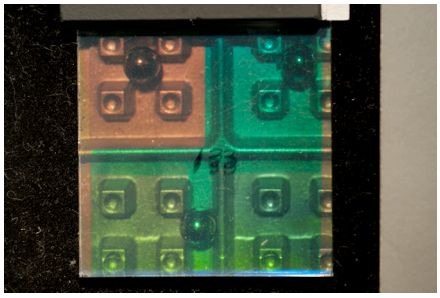
#130: GEO-3, 4500 uJ/cm^2 at 633 nm overall, 1600, 3200, 6400 uJ/cm^2 at 532 nm, 30" JD-4 @ 65F, TJ Bleach.



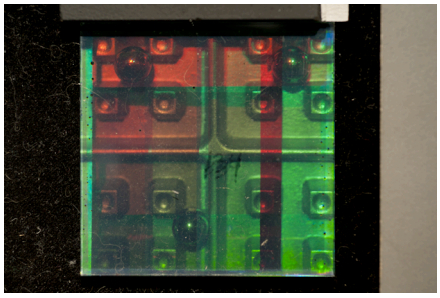
#131: GEO-3, 6400 uJ/cm^2 at 532 nm overall, 1600, 3200, 6400 uJ/cm^2 at 633 nm, 30” JD-4 @ 65F, TJ Bleach.



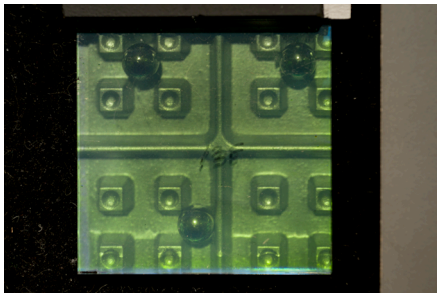
#132: GEO-3, 1600 uJ/cm^2 at 633 nm overall, 800, 1600, 3200 uJ/cm^2 at 532 nm, 30” JD-4 @ 65F, TJ Bleach.



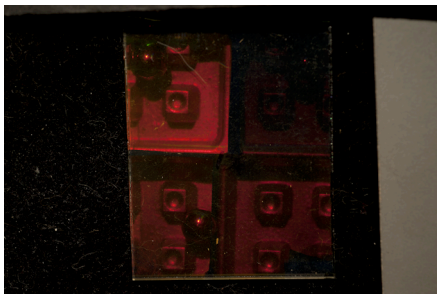
#133: GEO-3, 1600 uJ/cm^2 at 532 nm overall, 800, 1600, 3200 uJ/cm^2 at 633 nm, 30” JD-4 @ 65F, TJ Bleach.



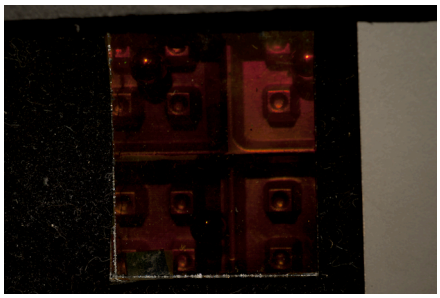
#134: GEO-3, 800, 1600, 3200, 6400 uJ/cm^2 at 532 nm plus 800, 1600, 3200, 6400 uJ/cm^2 at 633 nm in a checkerboard pattern to look for the elusive yellow, no luck. 30” JD-4 @ 65F, TJ Bleach.



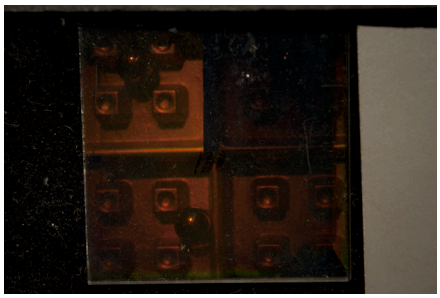
#135: GEO-3, 6400 uJ/cm^2 at 532 nm plus 6400 uJ/cm^2 at 633 nm, 30” JD-4 @ 65F, TJ Bleach. Not at all yellow, one would have to say it’s neutral!



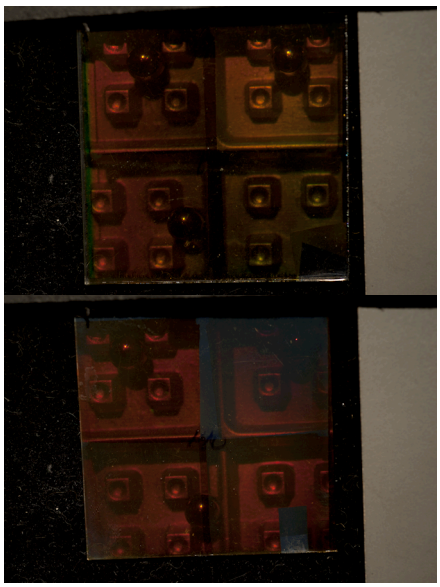
#136: Harman Red, 50, 100, 200, 400 uJ/cm^2 at 633 nm, 2' Pyrochrome Developer and Bleach. From an erased 4" by 5".



#137: Harman Red, 800, 1600, 3200, 6400 uJ/cm^2 at 633 nm, 2' Pyrochrome Developer and Bleach. From an erased 4" by 5".



#138: Harman Red, 50, 100, 200, 400 uJ/cm^2 at 633 nm, 2' Pyrochrome Developer and Bleach. Cut from a 30 by 40 cm.

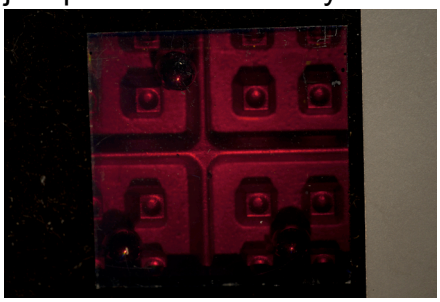


#139: Harman Red, 800, 1600, 3200, 6400 uJ/cm^2 at 633 nm, 2' Pyrochrome Developer and Bleach. Cut from a 30 by 40 cm.

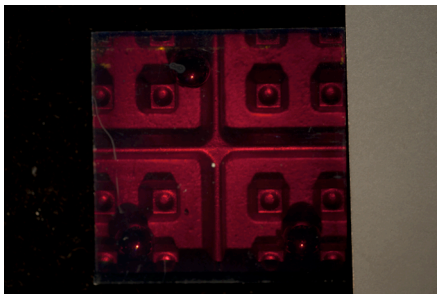
#140: Agfa 8E75HD, 50, 100, 200, 400 uJ/cm^2 at 633 nm, 2' Pyrochrome Developer and Bleach. Erased along with #'s 136 and 137.

I had been getting such noisy results with JD-4 and rehalogenating bleach that I decided to try the classic low noise formula with the Harman, namely the original Pyrochrome recipe. The lightly fogged label on the box worried me, so I erased all that were in there, plus some Agfa 8E75HD for comparison.

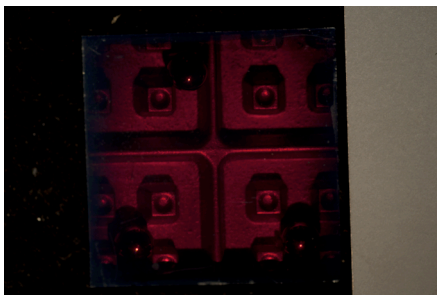
The 400 uJ/cm^2 at 633 nm step on the erased #136 looked extremely good! However its counterpart on the not erased #138 didn't match it; in fact it was lack luster. The Agfa peaked at the usual 200 uJ /cm^2, but it didn't look so good either, maybe it's from a batch that didn't like Pyro to begin with. But this is very encouraging, showing that good results can be had from Harman. However, it just proves it's basically an 8E75HD clone!



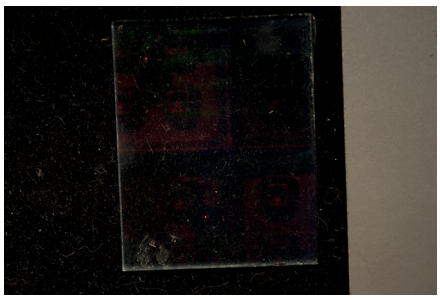
#141: GEO-3, 6400 uJ/cm^2 at 633 nm, 30" JD-4 @ 65F, TJ Bleach



#142: GEO-3, 9000 uJ/cm^2 at 633 nm, 30" JD-4 @ 65F, TJ Bleach

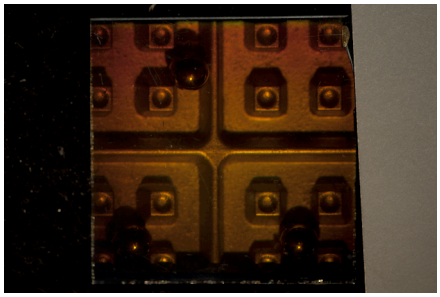


#143: PFG-03M, 6400 uJ/cm^2 at 633 nm, 30" JD-4 @ 65F, TJ Bleach

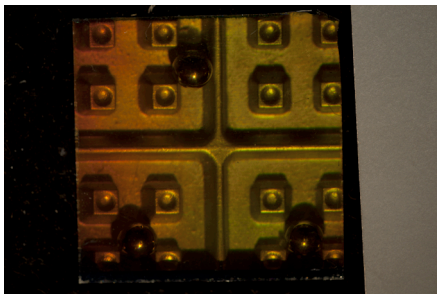


#144: Harman Red, 400, 800, 1600, 3200, uJ/cm^2 at 633 nm, 30" JD-4 @ 65F, TJ Bleach

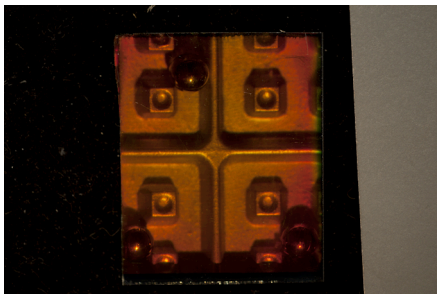
The Soviet style emulsions looked like they should, the 9000 GEO-3 looked orangey-er than 6400, PFG-03M very deep red. The Harman Red didn't seem to like this process, very weak. Painted #'s 141-143 black on back for comparison to old prize winners.



#145: Harman Red, 400 uJ/cm^2 at 633 nm, 2' Pyrochrome Developer and Bleach. Cut from a 30 by 40 cm.



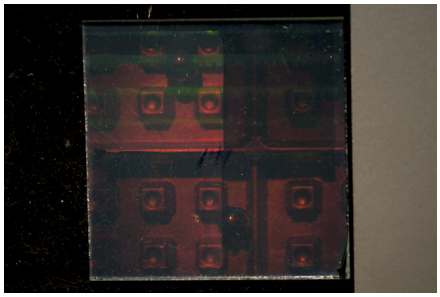
#146: Harman Red, 800 uJ/cm^2 at 633 nm, 2' Pyrochrome Developer and Bleach. Cut from a 30 by 40 cm.



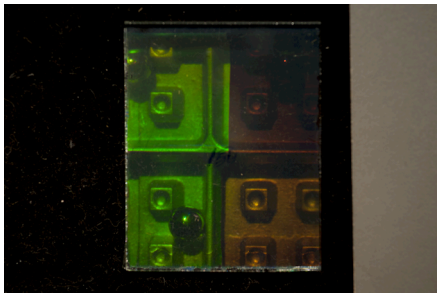
#147: Harman Red, 400 uJ/cm^2 at 633 nm, 2' Pyrochrome Developer and Bleach. From an erased 4" by 5".

All three look pretty good, the erased one looks a tad brighter, let's hope it doesn't need the pre-soak like BB! Need to test some more!

#148: Harman Red, 800 uJ/cm^2 at 633 nm, 2' Pyrochrome Developer and Bleach. From an erased 4" by 5". Turns out it was an erased BB-640.



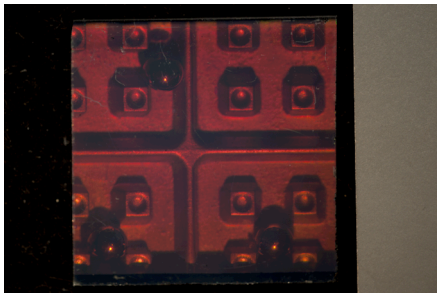
#149: Harman Red, 200, 400, 800, 1600 uJ/cm^2 at 633 nm, 2' D-19 Developer and TJ Bleach. From 30 by 40 cm.



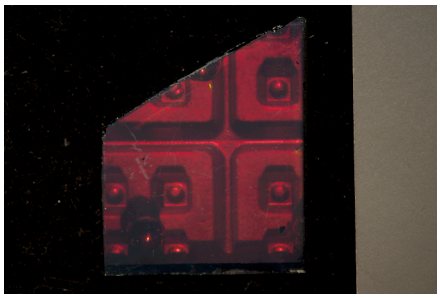
#150: Harman Red, 200, 400, 800, 1600 uJ/cm^2 at 633 nm, 2' D-19 Developer and Pyrochrome Bleach. From an erased 4" by 5".

#151: Harman Red, 200, 400, 800, 1600 uJ/cm^2 at 633 nm, 2' D-19 Developer and TJ Bleach. From an erased 4" by 5". Turns out to be a BB-640, and very weak.

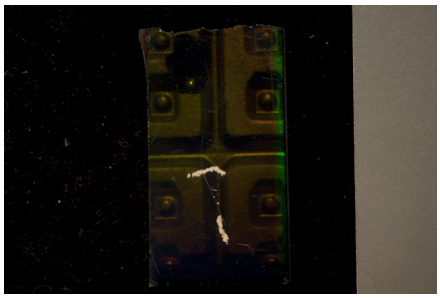
Looks we are proving that this new Harman is a slow batch of 8E75HD!



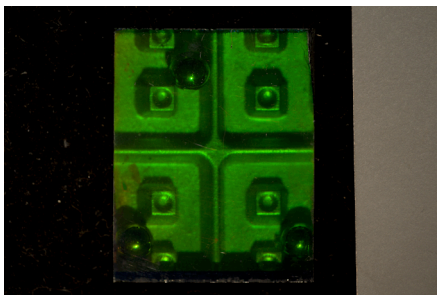
#152: Harman Red, 3200 uJ/cm^2 at 633 nm, 2' D-19 Developer and TJ Bleach. From 30 by 40 cm.



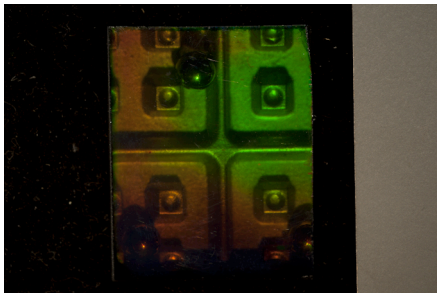
#153: Harman Red, 1600 uJ/cm^2 at 633 nm, 2' D-19 Developer and TJ Bleach. From 30 by 40 cm. Trapezoid shape.



#154: Harman Red, 1600 uJ/cm^2 at 633 nm, 2' D-19 Developer and Pyrochrome Bleach. From an erased 4" by 5.

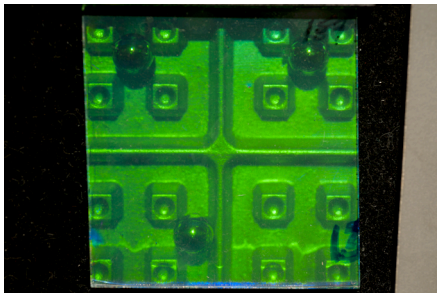


#155: Harman Red, 800 uJ/cm^2 at 633 nm, 2' D-19 Developer and Pyrochrome Bleach. From an erased 4" by 5.

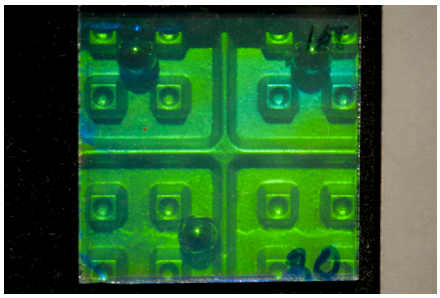


#156: Harman Red, 400 uJ/cm^2 at 633 nm, 2' D-19 Developer and Pyrochrome Bleach. From an erased 4" by 5.

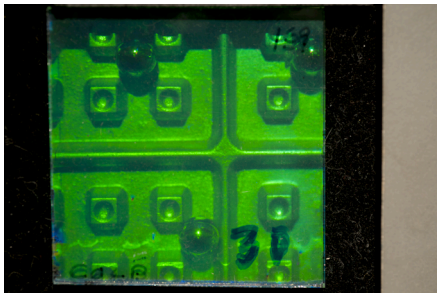
Some of these full-plates are OK. But they really don't stack up to GEO-3!



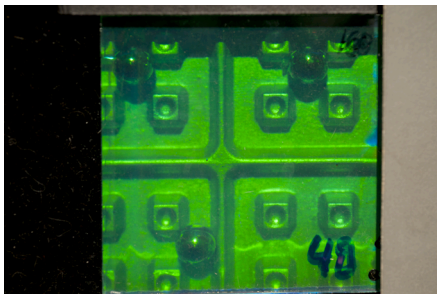
#157: Sphere-S GEO-3, 3000 uJ/cm^2 at 532 nm, 30” JD-4 @65F w/cold pre-soak, TJ Bleach.



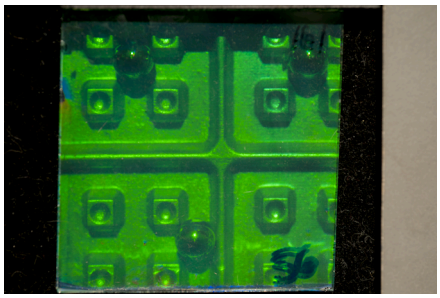
#158: Sphere-S GEO-3, 4200 uJ/cm^2 at 532 nm, 30” JD-4 @65F w/cold pre-soak, TJ Bleach.



#159: Sphere-S GEO-3, 6000 uJ/cm^2 at 532 nm, 30” JD-4 @65F w/cold pre-soak, TJ Bleach.

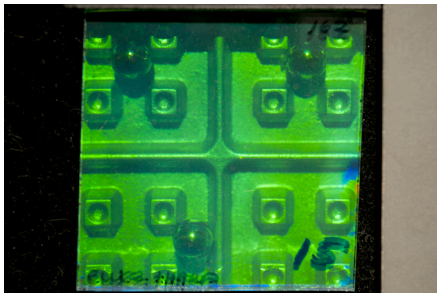


#160: Sphere-S GEO-3, 8400 uJ/cm^2 at 532 nm, 30” JD-4 @65F w/cold pre-soak, TJ Bleach.

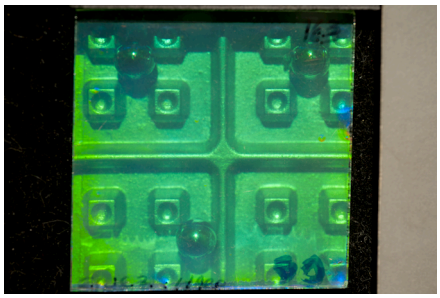


#161: Sphere-S GEO-3, 12,000 uJ/cm^2 at 532 nm, 30” JD-4 @65F w/cold pre-soak, TJ Bleach.

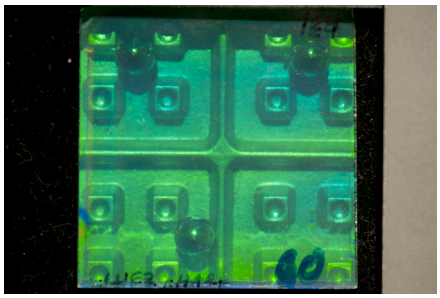
All the above were whole plates to show Hans Bjelkhagen that the TJ cold process works well with the GEO-3 Plates. The 6000 uJ/cm^2 looked best with regard to signal to noise and brightness. Produced real-time fringes with minimal emulsion shrinkage.



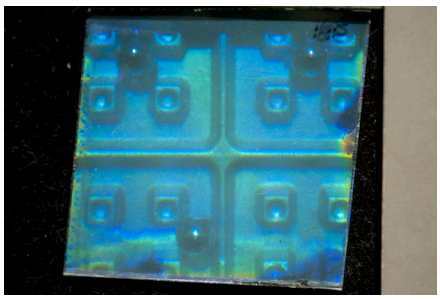
#162: Sphere-S GEO-3, 3000 uJ/cm^2 at 532 nm, Formaldehyde Prehardener 6', 2' CWC2 @ 70F, TJ Bleach.



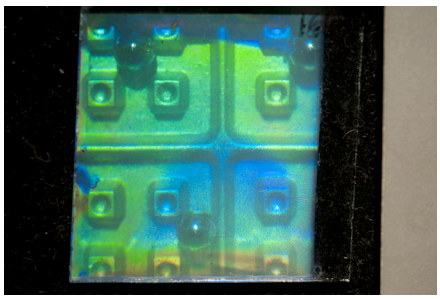
#163: Sphere-S GEO-3, 6000 uJ/cm^2 at 532 nm, Formaldehyde Prehardener 6', 2' CWC2 @ 70F, TJ Bleach.



#164: Sphere-S GEO-3, 12,000 uJ/cm^2 at 532 nm, Formaldehyde Prehardener 6', 2' CWC2 @ 70F, TJ Bleach.



#165: Sphere-S GEO-3, 6000 uJ/cm^2 at 532 nm, Formaldehyde Prehardener 6', 2' CWC2 @ 70F, TJ Bleach.

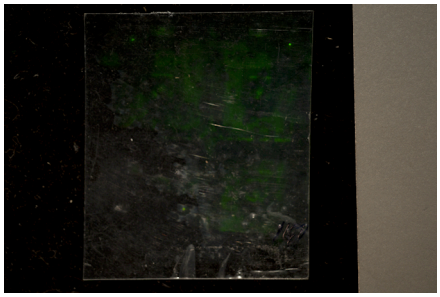


#166: Sphere-S GEO-3, 6000 uJ/cm^2 at 532 nm, Formaldehyde Prehardener 6', 2' CWC2 @ 70F, TJ Bleach.

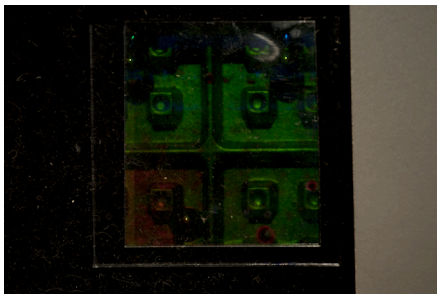
This series proved that there are alternative processing schemes for this material, however it proved that the Formaldehyde Prehardener is a must. #'s 165 & 166 were streaky, blue shifted, and fuzzy, the problem with the soft gelatin.

The CWC2 developer produced similar brightness to the Cold Process, but noisier. Check out the side by side comparison of the same exposures but different developers. Shifting the noisier CWC2 down an exposure stop still shows noise.

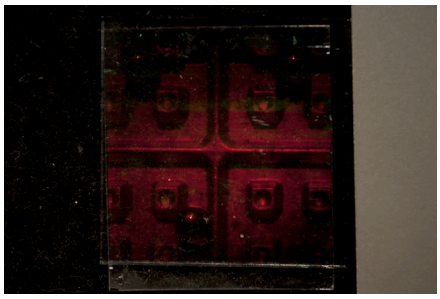
For these ultra-fine grain plates a higher contrast developer due to the higher pH of the Hydroxide accelerator, but suppressed by the lower temperature gives the better S/N ratio. However it remains to be seen what could happen if the CWC2 were used at the reduced temperature and maybe even time. But my gut feeling at the moment is that this regime would work better with the NaOH buffered stuff like D-8.



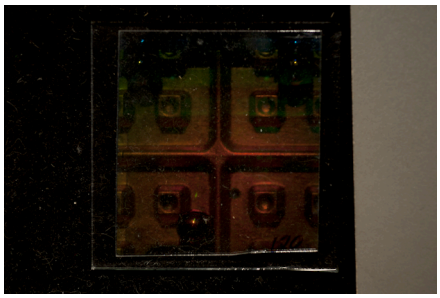
#167: Bayer Photopolymer, 532 nm, bad lamination, missing most of hologram. Accidentally laminated cover sheet side to glass, not polymer.



#168: Bayer Photopolymer, 532 and 632 nm simultaneously, orangey, not yellow. Maybe cutting red down to the proportion of 36/80 which is the ratio of the recommended doses will yield something good.

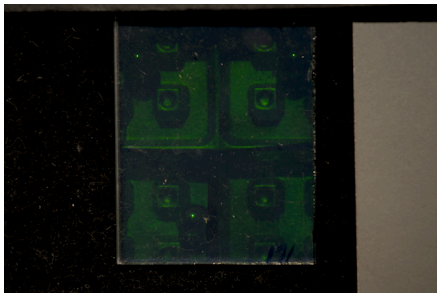


#169: Bayer Photopolymer, 633 nm for a half hour, pretty solid, but lamination needs to get under control!

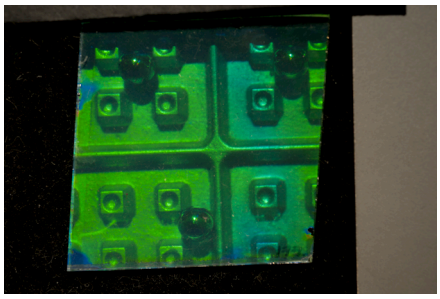


#170: Bayer Photopolymer, 40 mJ/cm2 at 532 first, then finished with red turned on. Looks more orange than above, but green is hardly noticed.

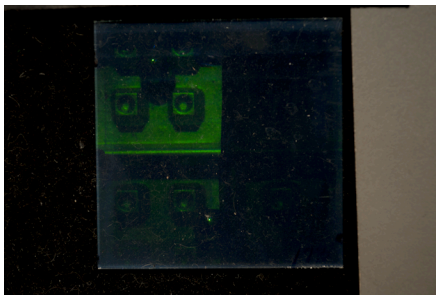
From the 4 above it appears that there is a very real need to get lamination under control before trying any more experiments with it!



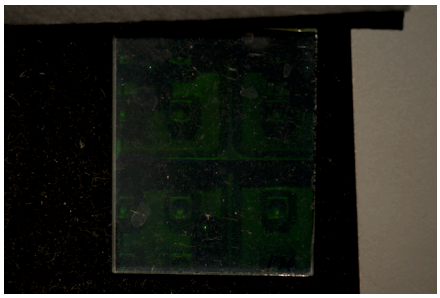
#171: Harman Green, 200, 400, 800, 1600 uJ/cm^2 at 532 nm, 30” JD-4 @65F w/cold pre-soak, TJ Bleach. Not very bright, however the minimal expo was the brightest!



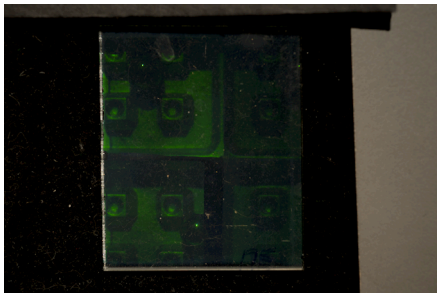
#172: Sphere-S GEO-3, 6000 uJ/cm^2 at 532 nm, 30” JD-4 @65F w/cold pre-soak, TJ Bleach. This one is to be painted black for the primo collection.



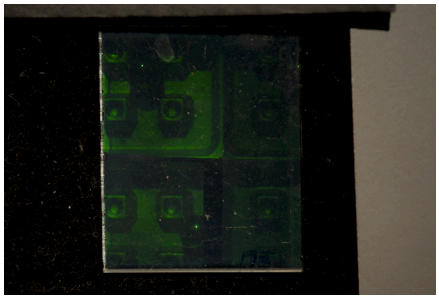
#173: Slavich PFG-03M, 3000, 6000 12,000, 24,000 uJ/cm^2 at 532 nm, 30” JD-4 @65F w/cold pre-soak, TJ Bleach. Only the longest had any density, but the quality was OK. But 24,000 expo was 128” expo!



#174: Harman Green, 200, 400, 800, 1600 uJ/cm^2 at 532 nm, 30” CWC2 @ 68F, and TJ Bleach. Like no density!

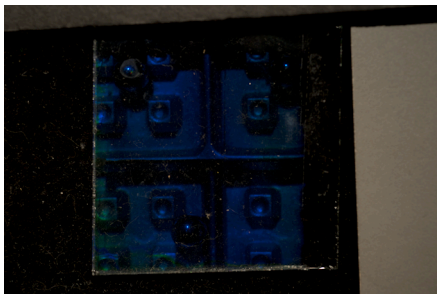


#175: Harman Green, 200, 400, 800, 1600 uJ/cm^2 at 532 nm, 1’ CWC2 @ 68F, and TJ Bleach.



#176: Harman Green, 200, 400, 800, 1600 uJ/cm^2 at 532 nm, 2’ CWC2 @ 68F, and TJ Bleach.

Giving Harman another chance, but the old stalwart, CWC2, just didn’t give anything of merit. I have this suspicious that Ascorbic Acid developers (LN-7 didn’t work well either!) are incompatible with this material. And it didn’t seem to like the cold water process, either!



#177: Sphere-S GEO-3, 3000, 6000 9000, 12,000 uJ/cm^2 at 532 nm, 30" JD-4 @65F w/cold pre-soak, TJ Bleach. Shifted to blue as expected, however it wasn't very bright. Maybe this bleach is not good for the material.

Grand Finale: It looks like the GEO-3 is the reflection hologram material we have been waiting for! It gives good solid red and green images with minimal fuss. Once the cold water processing was discovered to work, the formaldehyde bath was eliminated, and repeatable easy results can be attained.

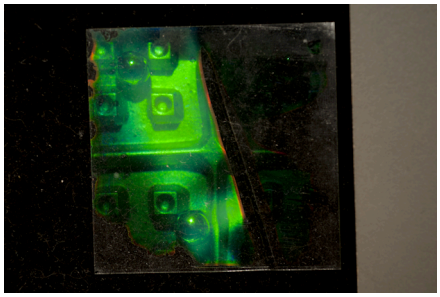
There are other things to play with, like different bleaches, but I think that the same results will be found no matter which one is used. That could wait for another time, let's move on to the next thing!

EXPERIENCES WITH CONTEMPORARY HOLOGRAPHIC PLATES, 2012

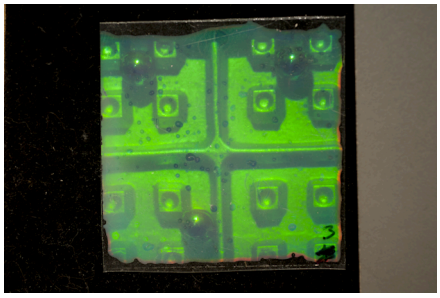
Starting a new series starting with #200, since it's a new year. First Waffle Irons were shot with Hans Bjelkhagen during his winter visit.

#200: There is no #200.

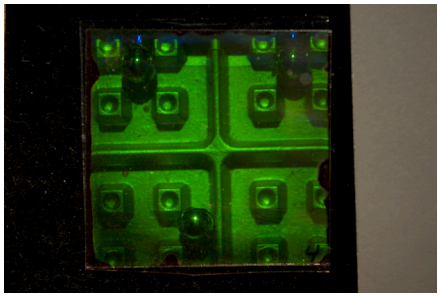
#201: Polygrama Green Photopolymer, 3600 uJ/cm^2 at 532 nm, dim green image. Hans took this one with him.



#202: Polygrama Green Photopolymer, 3600 uJ/cm^2 at 532 nm, dim green image, got kinked in lamination.

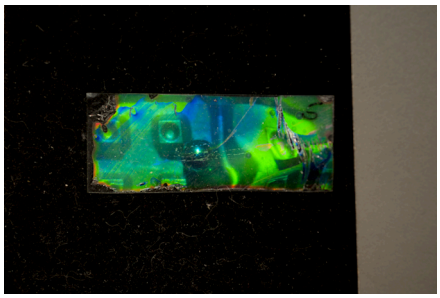


#203: Polygrama Green Photopolymer, 3600 uJ/cm^2 at 532 nm, laminated side toward object, dim green image.

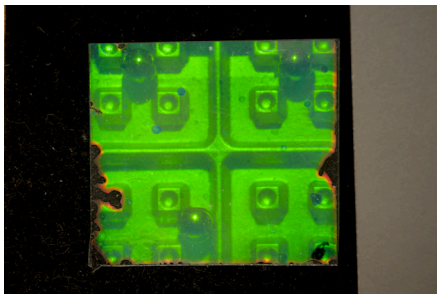


#204: Bayer Photopolymer Batch #2, 3600+ uJ/cm^2 at 532 nm, didn't get bleached completely.

Eventually #'s 201 – 203 were heated and yielded nice and bright holograms!

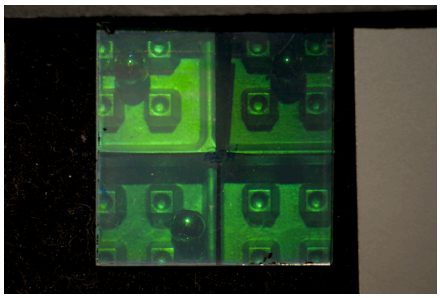


#205: Polygrama Green Photopolymer, 3600 uJ/cm^2 at 532 nm, small strip, wrong side heated, warped.

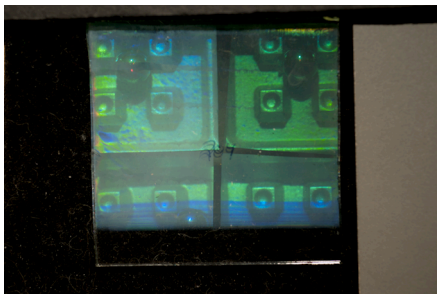


#206: Polygrama Green Photopolymer, 3600 uJ/cm^2 at 532 nm, full plate, done as perfect as could be. (All the above have plenty of dust spots.

#207: Bayer Photopolymer Batch #2, left on for about 15 minutes (18000 uJ/cm^2 at 532 nm), didn't bleach clear. Doesn't seem as bright as Polygrama, but much better signal to noise. Hans also took this one with him.

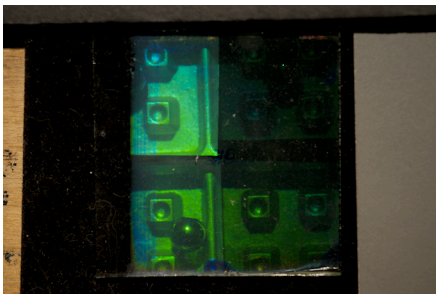


#208: Ultimate U08 Green, 100, 200, 400, 800 uJ/cm^2 at 532 nm, (200 recommended), 4' @ 70F Ultimate Developer plus Ultimate Bleach. 800 best.

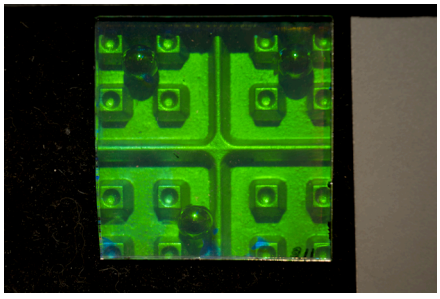


#209: GEO-3, 800, 1600, 3200, 6400 uJ/cm^2 at 532 nm, 4' @ 70F Ultimate Developer plus Ultimate Bleach. Quite a bit overdone!

#210: GEO-3, 100, 200, 400, 4' @ 70F Ultimate Developer Bleach. Correlates that 800 is this material in this processing

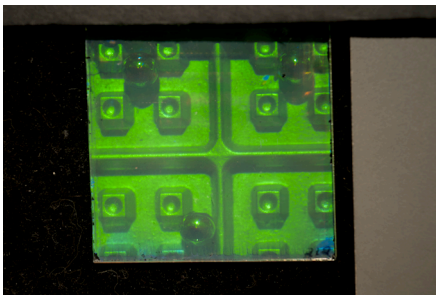


800 at 532 nm, plus Ultimate also optimum for scheme.

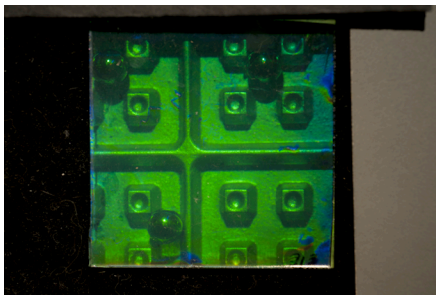


#211: Ultimate U08 Green, 800 uJ/cm^2 at 532 nm, 4' @ 70F Ultimate Developer plus Ultimate Bleach. The standard of comparison for this material.

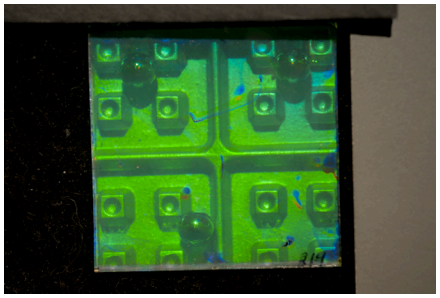
#212: Ultimate U08 Green, 532 nm, 4' @ 70F Ultimate Ultimate Bleach. Hedging our considerably noisier than



1600 uJ/cm^2 at Developer plus bets, but this is above.



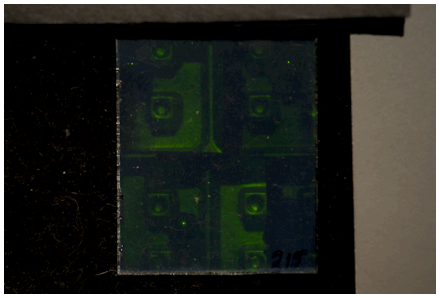
#213: GEO-3, 800 at 532 nm, 4’ @ 70F Ultimate Developer plus Ultimate Bleach. Decently bright , but plagued by blue shrinkage marks, even though it was dunked in cold water before processing. Close second to #211.



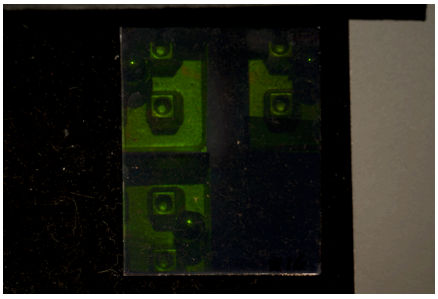
#214: GEO-3, 1600 at 532 nm, 4’ @ 70F Ultimate Developer plus Ultimate Bleach. More blue marks, emulsions of this and above may have touched other emulsions or edges and scratched things up.

Conclusions on the above: Ultimate plates and processing are just a tad better than GEO-3. Ultimate processing gives GEO-3 a stop or two more of speed compared to the standard “Cold Processing”, but had shrinkage problems. If there were more materials, just developing GEO-3 in Ultimate at 65F would be a good trial.

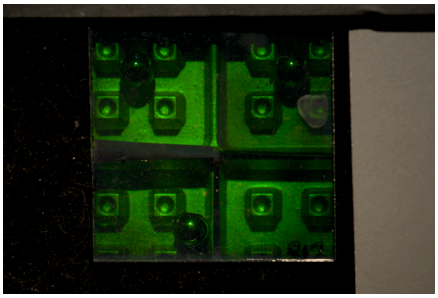
Comparing #211 to the waffles made in May of 2011 to prove to Hans the power of the Cold Process, there is a bit more brightness and definitely better S/N.



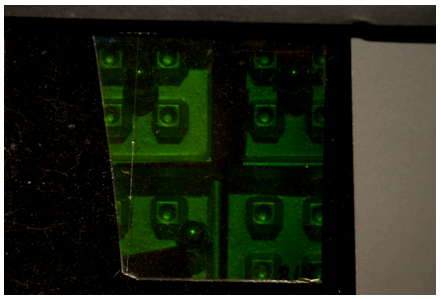
#215: Harman Green, 200, 400, 800, 1600 uJ/cm^2 at 532 nm, 45" @ 72F JD-4, TJ Bleach. Nothing to write home about, even following the LaserSmith's recommendations.



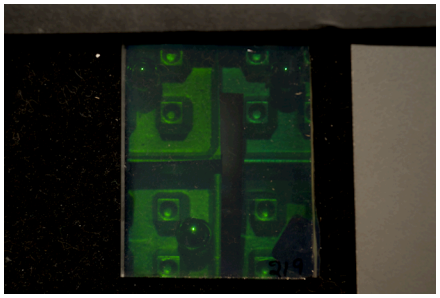
#216: BB-520, 800, 1600, 3200, 6400 uJ/cm^2 at 532 nm, 45" @ 72F JD-4, TJ Bleach. Better than the above, not as good as 5' in D-8.



#217: U08 Green, 800, 1600, 3200, 6400 uJ/cm^2 at 532 nm, 45" @ 72F JD-4, TJ Bleach. Better than the above, although not as good as its own process.



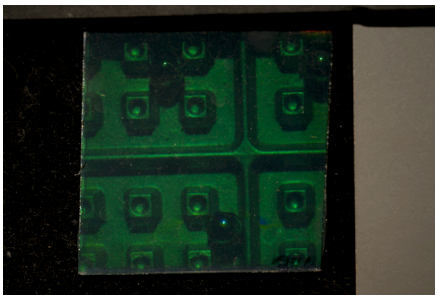
#218: BB-520, 800, 1600, 3200, 6400 uJ/cm^2 at 532 nm, 5' @ 72F JD-4, TJ Bleach. Much better than #216, almost like Ultimate.



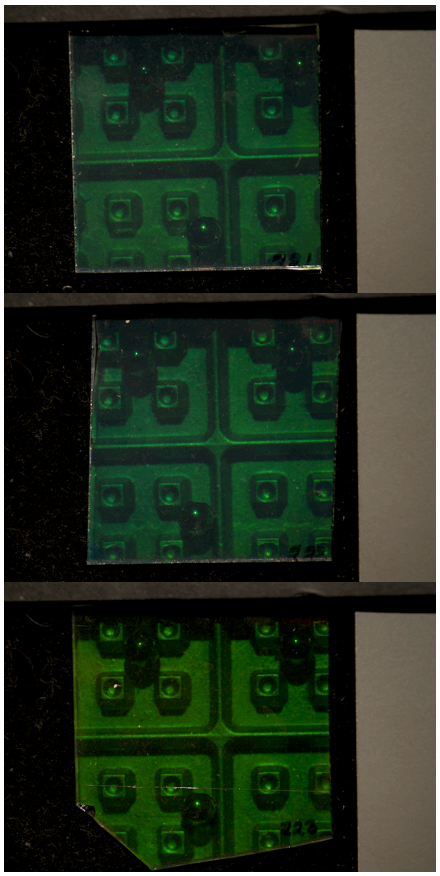
#219: Harman Green, 200, 400, 800, 1600 uJ/cm^2 at 532 nm, 45" @ 72F JD-4, TJ Bleach. From a fresh box of 30 by 40 cm plates. Better than #215, still not great.

#219a: Harman Green new box fog test, yes there is some, maybe .3 density even!

#220: Harman Green, 200 nm, 45” @ 72F JD-4, TJ



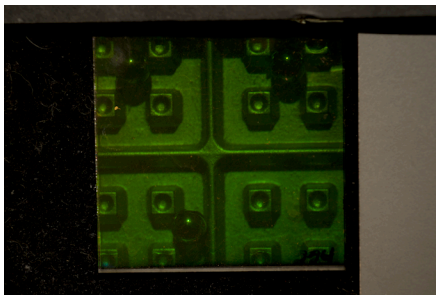
uJ/cm^2 at 532 Bleach.



#221: Harman Green, 400 uJ/cm^2 at 532 nm, 45” @ 72F JD-4, TJ Bleach.

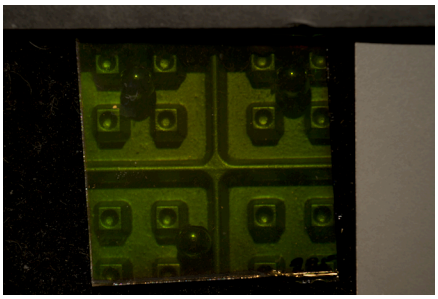
#222: Harman Green, 800 uJ/cm^2 at 532 nm, 45” @ 72F JD-4, TJ Bleach.

#223: BB-520, 6400 uJ/cm^2 at 532 nm, 1’ @ 72F JD-4, TJ Bleach. Was supposed to go for 5’, yanked early because of high density. What gives with consistency?

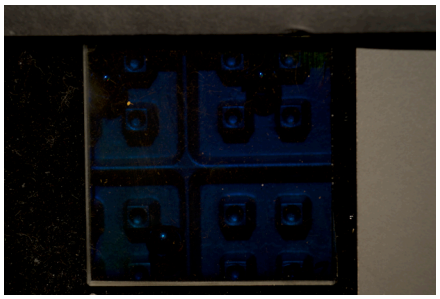


#224: Harman Green, 200 uJ/cm^2 at 532 nm, 2' @ 70F Pyrochrome Developer, TJ Bleach.

#225: Harman Green, 400 nm, 2' @ 70F Pyrochrome Bleach.

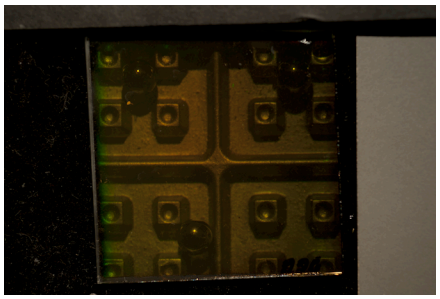


uJ/cm^2 at 532 Developer, TJ



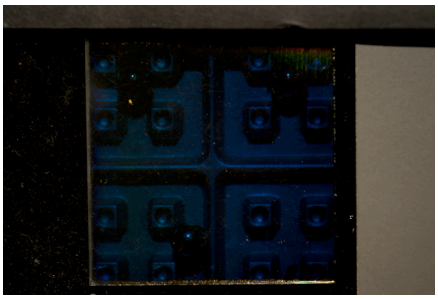
#226: Harman Green, 800 uJ/cm^2 at 532 nm, 2' @ 70F Pyrochrome Developer, TJ Bleach.

First time we're seeing decent results with this material! 200 seems the best, and the color is a decent green.

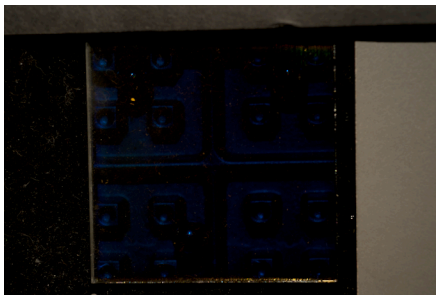


#227: Harman Green, 200 uJ/cm^2 at 532 nm, 2' @ 70F Pyrochrome Developer and Bleach.

#228: Harman Green, 400 nm, 2' @ 70F Pyrochrome Bleach.

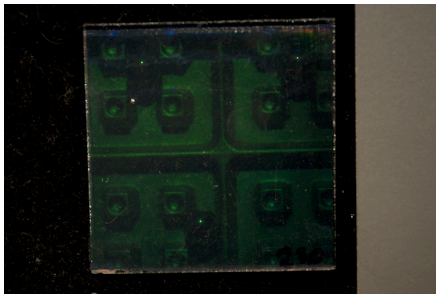


uJ/cm^2 at 532 Developer and

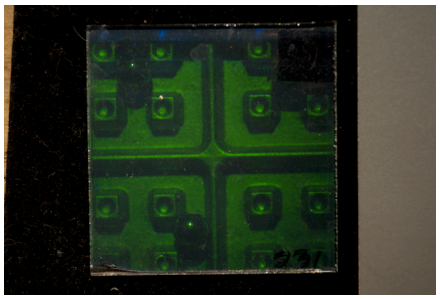


#229: Harman Green, 800 uJ/cm^2 at 532 nm, 2' @ 70F Pyrochrome Developer and Bleach.

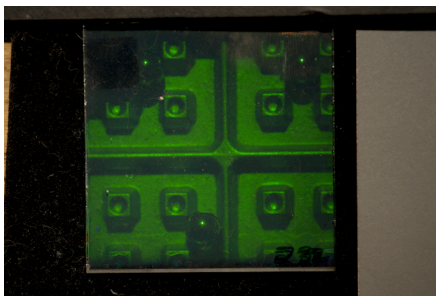
The above shifted pretty far into the green, but decently bright when up-shifted by breathing on them.



#230: Harman Green, 200 uJ/cm^2 at 532 nm, 2' @ 70F D-19, TJ Bleach.



#231: Harman Green, 400 uJ/cm^2 at 532 nm, 2' @ 70F D-19, TJ Bleach.



#232: Harman Green, 800 uJ/cm^2 at 532 nm, 2' @ 70F D-19, TJ Bleach.

If I were to do this again, I would try 1600 as the 800 was the best. My conclusion on Harmans, both Red and Green, use D-19 or Pyro depending on what you want to do.