COLORED “GLITTER”

This article will share my journey to creating a true red “glitter”, and a little about myself. I am new to pyro, been building for a year at this point, but have always dreamed of doing this. Since I’ve begun, I have found a love for the beauty that is the glitter effect. I’m not a chemist, nor do I have any higher education to explain the technical details about what is going on in these reactions. I’m just a guy who is a “do-er” that loves experimenting with enough understanding to try and create something, and stubbornness to keep trying when I fail. I hope to understand this all well enough someday to contribute something meaningful to another new guy, like all the greats on this site have for me. I won’t ever do this for profit, I only do this because it provides so much beauty and joy.

I reference the glitter in this article with quotes because it is not actually a glitter. It is my attempt to so closely copy the effect that you can’t tell it isn’t real. This all started because someone shared a video in the forum, linked here https://fireworking.com/content/red-glitter-comp, which led to a lot of questioning by everyone, me wanting to try it, and some very knowledgeable guys willing to point me in the right direction.

We’ll start with the current limitations, and requirements. According to the great minds of pyrotechnics, some of whom grace the pages of Fireworking, in all their studies and trials, colored glitter is not possible. I will let someone smarter than me argue that fact if they want, I’ll accept it as a hard fact. That leaves me with one option, make a work around to duplicate it.

The requirement, according to Winokur, to be glitter, the effect needs to be dispersed and at variable distances behind the burning star, then burst suddenly with a distinct flash of light.

I bought two books to figure this out, Pyrotechnica II & X. In II, Winokur talks about a micro star flash effect, and in X, Shimizu shares an exhaustive study of micro stars specifically designed to have a delay and flash component. He also references the “delay” composition he tested in. This ultimately led to my success, which I’ll share later. Now on to the failures, so you don’t waste time trying to reinvent the wheel like I love to do, and some safety notes.

SAFETY:

1. These micro stars are only made with nitrate, which might give a false security. They are impact sensitive, and when it goes, it’s just as loud as a grain of crackle. I have only been able to get them to explode hitting them between steel on steel. This is good because you need to hit the comp to produce proper stars. They don’t appear to be friction sensitive at all.
2. These are made with NC lacquer (acetone) and parlon. The acetone is extremely flammable, and gives you a heck of a headache if you breathe it. I don’t know what the reaction is, but I know when acetone dissolves parlon, it also releases some nasty stuff that you don’t want to breathe. Bottom line, do this in a well ventilated area with proper PPE.

FAILURES:

What I initially knew was this needed to be a matrix star with a carrier, and a micro star. When I first heard these were micro stars, I thought “Great! I have red micro stars for my gerbs, I’ll use those in a glitter star”. That turned out to look like nothing other than a standard gold glitter star. I asked some questions, and Mike Swisher, who guided me in identifying most of what was failing and what to try, chimed in. He told me the red star I was using, Hardt #1, wouldn’t work because they just burned with the comp. He also told me I needed to use a faster burning comp for the matrix. I had a beautiful red metal fuel star that produced a strobing burn, seen here, https://youtube.com/shorts/A8M5V88Xjfc?feature=share

The same problem repeated itself with these embedded in a charcoal star. It looked just like a charcoal star with a red burning head. Again, the stars weren't dropping out.

https://youtube.com/shorts/7DDm4C54Ekc?feature=share

I over complicated my thought process, and figured I needed a slow burning delay prime to let them drop out before burning. I asked how such a thing could be accomplished, and Ned shared a method. I never did get that figured out. Mike was watching, and chimed in again and told me to buy the aforementioned books, and keep using a charcoal star for a matrix. Thankfully, I listened.

Shimizu's testing and corresponding key and tables to understand the results, is enough to make the average man's brain bleed. I read, and re-read it until I finally eliminated all but his nitrate-metal stars from what I wanted to use. The following is my testing with that and the matrix comp. Both are important, and so is paying attention to how he explains to make the stars.

The first test used C6 as the matrix and Shimizu #87 since it was a strontium nitrate based star, and fit correctly with the delay and flash requirements. This is a ¾" x ¾" comet. It showed me the effect was at least possible, but it wasn't red, or overly amazing.

https://youtube.com/shorts/QVDZv8Xh_k4?feature=share

Mike was back to the rescue, he simply said ad parlon. If I wasn't dealing with my brain bleeding from reading, I would have realized Shimizu lists this in formula # 162. A repeat test with this change really gave me hope and this was the result with another ¾" comet

https://youtube.com/shorts/evSnfP9NoOM?feature=share

I was happy with it, but again, it wasn't amazing. I attributed this to not having enough micro stars in the matrix due to its size. I needed a bigger comet because increasing the percentage of micro stars in the smaller one wouldn't let it bind, and they fell apart (don't ask how much time I wasted on trying).

Thankfully, I listened to TR the first time I met him when he gave me the best piece of advice, "If you want to make custom stuff, you need to be able to make your own tools, buy a lathe." I did, and subsequently retired to my garage to make a new comet pump for the project.

Finally on to what worked, the process and formulas.

Matrix:

The best I've tried is just the standard C6 with 27% of its weight of added micro stars. It is dampened only enough to consolidate it when pumping. This was pressed to 1100 psi on the comp.

Base comp:

The C6 is important. I tried speeding it up to a "C5" and it burned up too fast so the micro stars flew out like a mine, and C8 which burned too slowly to let the microstars drop out far enough before their flash phase.

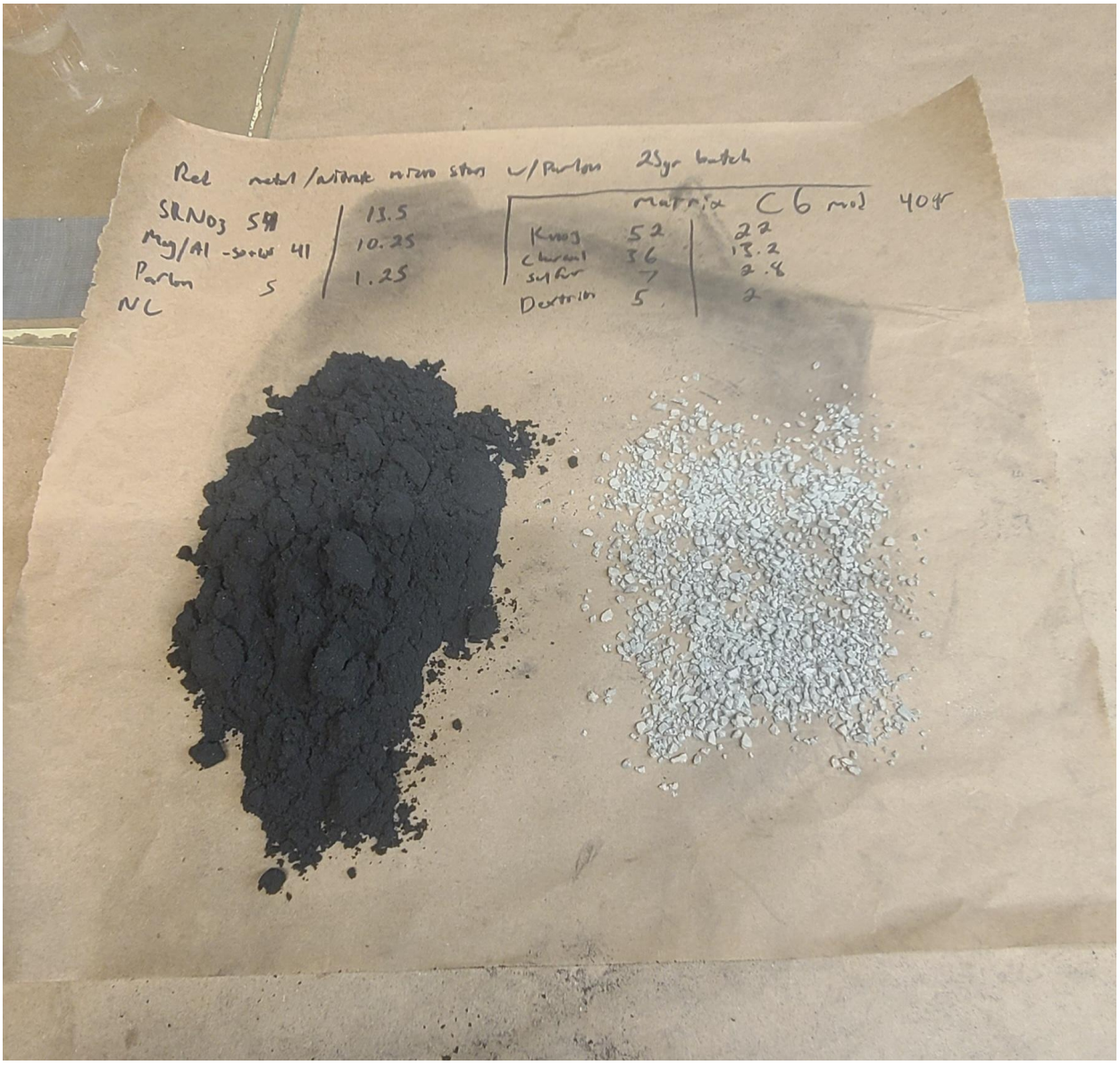
Micro stars:

The comp is Shimizu #162 referenced in Pyrotechnica X (slightly modified due to not having 70 mesh mag/al)

Strontium Nitrate:	54
Mag/al -50+100:	41
Parlon	5

This is bound with home made NC lacquer using Lloyd's shotgun power method. I have no idea what percentage of NC this would be considered. It is the consistency of warm honey. I add enough to the above mix to make it the consistency of soft playdough, but not sticky. This takes some trial and error. ***Important*** put down a little bp dust on whatever surface you're going to roll the patty out on, to prevent sticking. They don't need priming. Put down 2 popsicle sticks to set the thickness, and roll out the comp into a patty. DON'T TOUCH IT UNTIL DRY so it looks like this

Once it is fully dry, and rock hard, place the whole patty in a plastic bag. Now for that impact part I mentioned at the beginning. Place the bag on a hard wooden surface and hit it with a plastic mallet to break it apart. You will end up with some powder that will be screened off, but what you are after is a bunch of random shaped pieces with jagged edges or varying sizes between roughly ⅛” - ¼” at the biggest. Ignore the C6 comp in the photo, it isn’t C6, I was trying something for burn speed.



I think the varying shapes and sizes is what allows the varying distance of drop in the tail, and timing and intensity of the flashes.

The 1” comet size seems to work perfectly. I made them in the following lengths, 1”, 1 ⅛”, 1 ¼” for testing. It needed 15gr, 16.5gr, and 18gr respectively of total comp. I also wanted to try them paper wrapped like a crossette. This produced a cool effect. The burn time was drastically extended, and they seemed to produce some thrust at the end and jet around. Here is the final video. The first is a 1 ¼” that is bare, the second is a 1 ⅛” that is paper wrapped. The shorter, lighter one burned longer.
https://youtube.com/shorts/BpWgXgXktxU?feature=share

Future tests will include making larger comets, and trying green using formula #161 which just swaps out barium nitrate for strontium. I have made the stars already, but believe they need tweaking. They are harder to light, don't have as much of a delay, and the color has a yellow tint to it. I have some thoughts to fix it, but that's for another day. I'll share my findings, if they are worthwhile.
I hope this was helpful, and interesting. It was my first article, and hopefully not my last.

Josh Tyrrell