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Tests of Enamel on Argentium Silver 940 - March, 2024

By Cynthia Eid

Background:

Opaque enamels work well on Argentium Silver. Transparents work well on AS if torch-fired. However, transparent enamels tend to discolor on AS 930 and 935 if kiln-fired.

From 2010-2017, I conducted numerous tests of transparent enamels on Argentium Silver 930 and 935 fired in a kiln. Troy Hines and Joanne Conant worked with me on many of these tests. I finally gave up on kiln-firing transparent enamels on AS.

I did not expect Argentium Silver 940 to be successful with kiln-firing transparent enamels, since there is only a small increase in the amount of silver from AS 935 to AS 940.

Recently, I learned that some people have been successful with enameling on AS 940, so I felt encouraged to run some tests.

Summary of my March, 2024 tests:

Because transparents on silver generally need to be over a clear "flux" enamel, and because clarity is most easily judged on a clear enamel, I made 4 tests using Argentium 940 with an emphasis on testing fluxes. I tested:

- 3 unleaded fluxes by Thompson - 2020, 2030, and 2040
- 1 unleaded flux by WG Ball - 477
- 1 leaded flux by Ninomiya.
- both leaded and unleaded transparent colors
- I also compared the results of using "raw" or "fresh" AS 940 that has not been heated after purchase vs. AS 940 that has been "depleted" by heating and pickling repeatedly.

Conclusions:

- Kiln firing transparents on Argentium Silver works best on metal that has been "depleted" by repeatedly heating and pickling,
- Thompson's unleaded 2030 flux worked the best of those tested.
- Both warm and cool transparent colors worked well over the 2030 flux. Some colors worked well directly on the silver.

What's Next:

- Further testing using 2030 and unleaded transparent enamels
- Further testing of leaded fluxes and transparents. (I leave that to someone else, because I currently work primarily with unleaded enamels by Thompson and WG Ball.)

Here is my first finished piece of transparent Thompson enamels on Argentium 940 - a brooch titled Autumn Cascade.

It turned out pretty well, except for two problems:

- After repeated firings of layers of enamel, some darkening happened under the enamel. Fortunately, it emphasizes the texture under the enamel.
- Being champleve, there is a lot of bare silver around the enamel. It showed a bit of firescale. The metal was too thin, and the firescale was too deep for it to be completely removed.

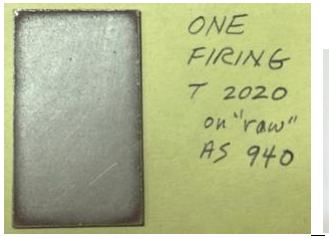


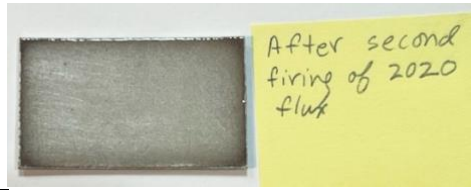


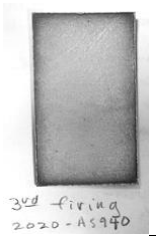
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Enamel on Argentium Silver 940 - Test #1 - Cynthia Eid

A Side

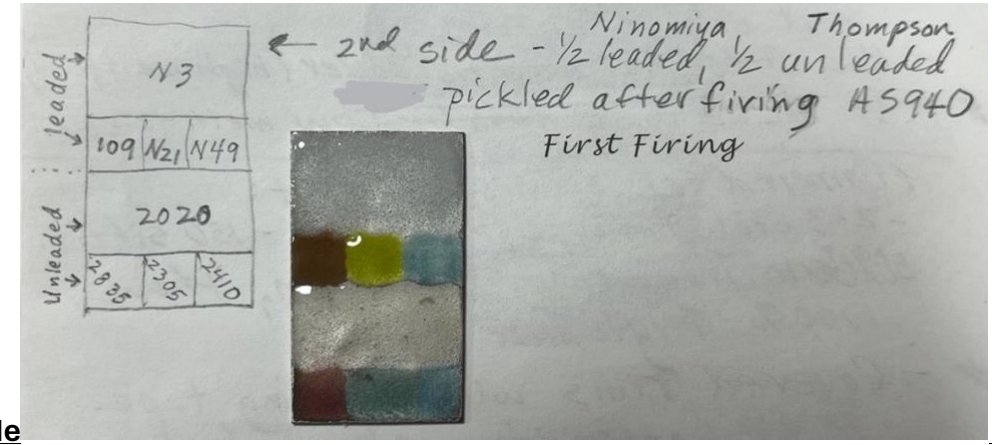




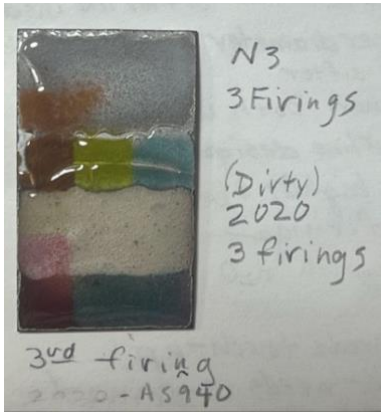


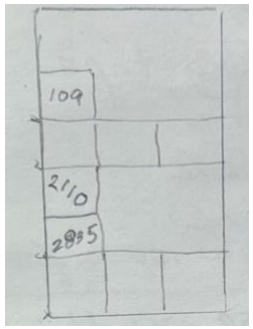


B Side









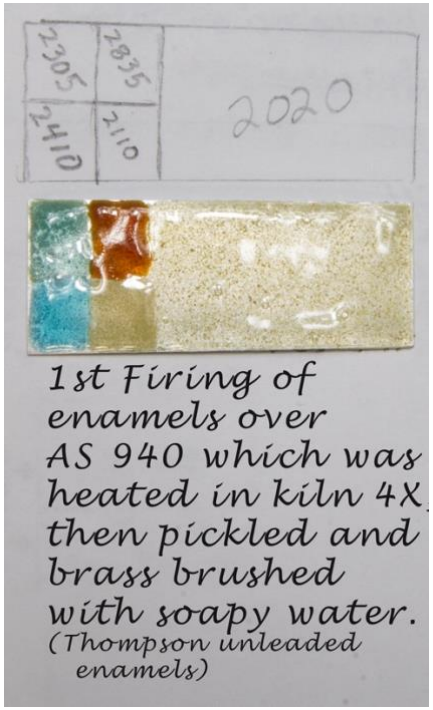
Conclusions:

A - Unleaded 2020 looks pretty good on raw, except for around the edges.

B- Unleaded 2020 looks promising on "depleted" AS 940. N3 (leaded Ninomiya) turned very gray.

Enameling on Argentium Silver 940 - Test #2 - by Cynthia Eid - March 1, 2024

Side A- 2020 Flux





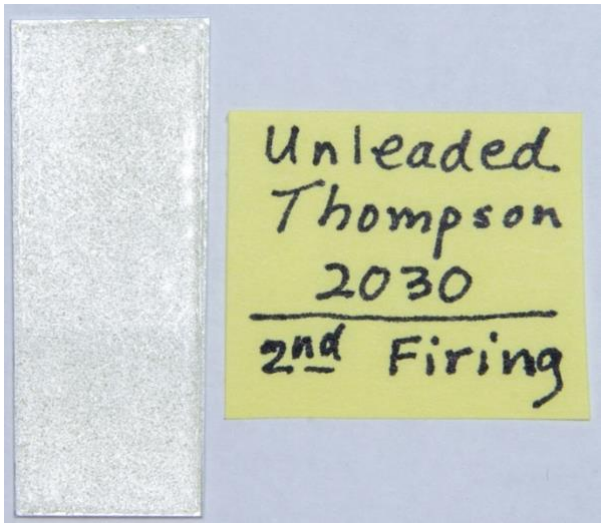




The transparent colors look pretty good, but the Thompson 2020 unleaded flux is disappointingly yellow and spotty.

The Thompson unleaded 2030 flux looked great for the first two firings. Disappointed with the discoloration in the 3rd,4th, and 5 firings.

Side B- 2030 Flux









Conclusions: Inconclusive results, but it seems that preparing the AS by heating and pickling before enameling is helpful. 2030 looks promising.

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Enamel on Argentium Silver 940- Test #3 by Cynthia Eid

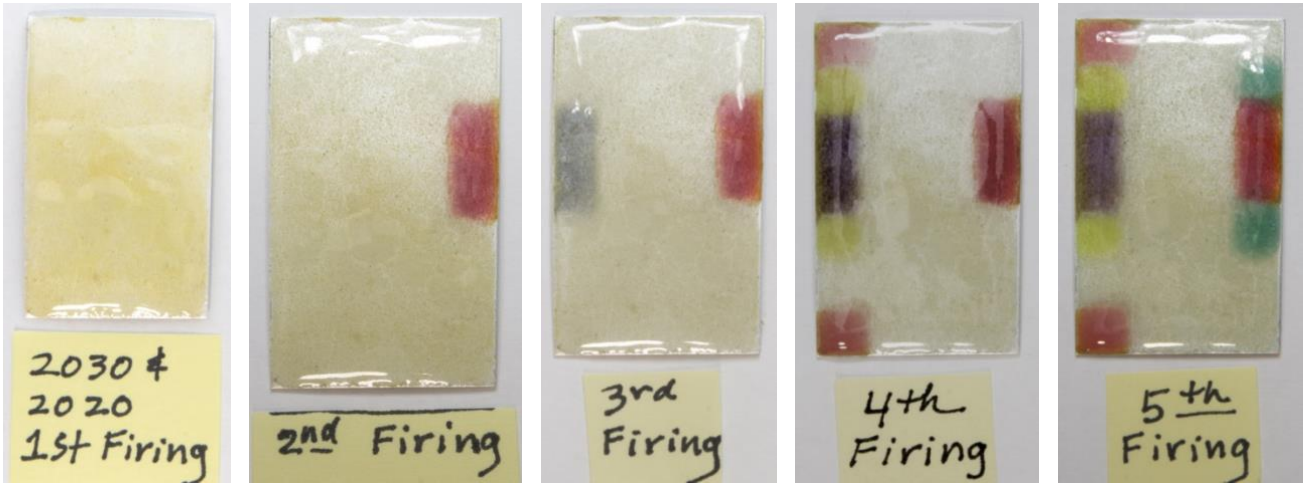
Having concluded that preparing the AS 940 by heating and pickling repeatedly works best, I tested 4 unleaded fluxes.

Side A:



This was a test of Thompson's unleaded 2040 and WG Ball's unleaded 755.

Side B:



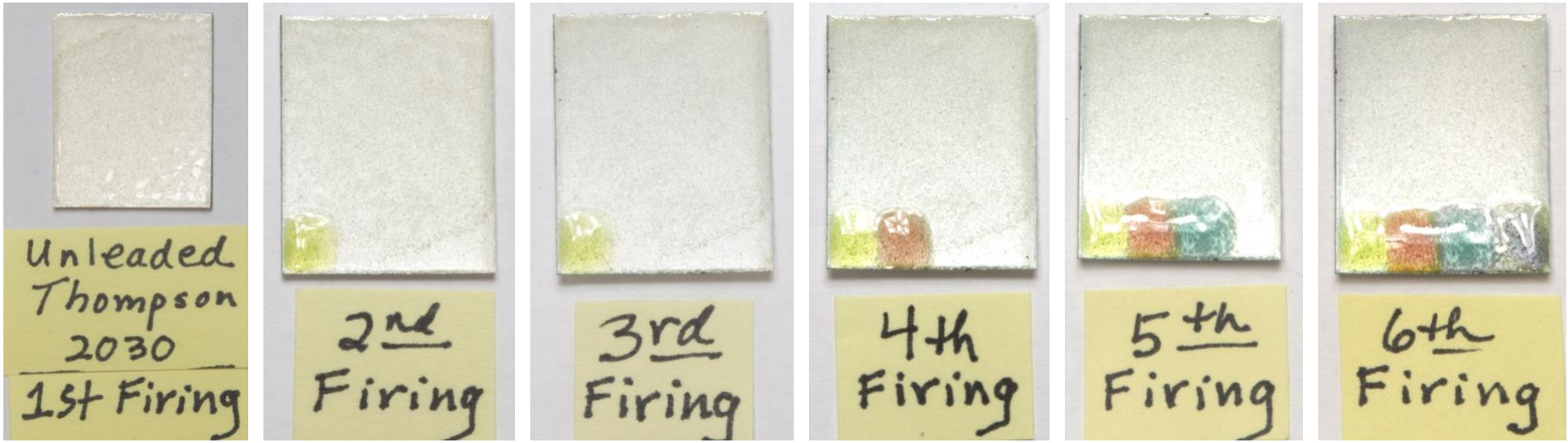
The top third is 2030; the lower two-thirds is 2020. The colors are Thompson unleaded transparents.

Conclusions: Thompson's unleaded 2030 on AS 940 that has been repeatedly heated and pickled is the most promising flux.

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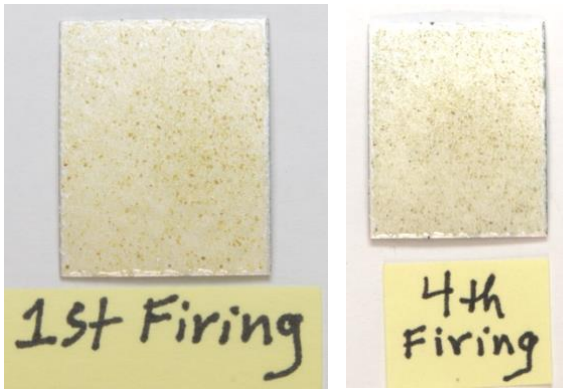
Enamel on Argentium Silver 940 - Test #4 by Cynthia Eid

Following up on the most successful of the prior tests, I prepared a piece of 22 gauge/.8mm thick Argentium Silver 940 by heating in a kiln set at 1450°F for ~1.5 minutes. It was air cooled and pickled each time.



Side A: I tested Thompson Unleaded 2030 (clear flux) along with 4 transparent Thompson unleaded colors on "depleted" AS 940.

Side B: I tested Thompson's Unleaded 2020 flux one more time, since it is usually the first choice for fine silver.



Conclusions: Side B: Thompson's unleaded 2020 was disappointingly yellow and spotty.

Side A: After 6 firings, the 2030 flux was still clear, and the colors were good. Success!

Next, I will make a small, simple enamel piece preparing the Argentium Silver 940 as described above, using 2030 flux.