

In 1969, when visiting an art historian's home and pottery studio, I noticed a handsome wooden box on a table in the living room, and asked what was in it. He replied, "You can open it, but only over the carpet." Inside was a brocaded cloth bag, which opened to reveal a chawan with a curdly, curdly-white glaze suffused with orangey passages. I fell for this 400-year-old beauty straightaway. Soon I was avidly searching for museum holdings and pictures of other Japanese Shino-glazed ware. I was attracted to the rich color variations and wildly textured surfaces of these Momoyama-era originals, and wanted to replicate them. I've been using two recipes to glaze my Shino-revival wares. The orange color, which the Japanese call 'fire color', was elusive until I developed a doorless fiber kiln in 1975. Before installing one in my own studio, I built a dozen of these kilns, including one for Penland School of Crafts in North Carolina. This kiln(pg.4), together with an OxyProbe, gave me fine control of both temperature and atmosphere as well as a reliable pyrometer to note the temperature after the cones fell and all through the cooling cycle.

Yet even in the new kiln, fire color was spotty. I began to guess that reduction at Cone 08 was late for these early sintering, lithia-rich glazes. So I tried reducing earlier at Cone 012, and good fire color showed up on all the pots. This satisfied my Shino- lust for awhile, but eventually I began to wonder if the more deeply colored Aka(red) Shino might be achieved without the use of the customary slip beneath the glaze. Although much had been written about the importance of reducing Shinos, I wondered if a soak in oxidation might intensify the color. So, after a normal reduction firing to Cone 10, I cooled the kiln to Cone 4, then lit it again, holding that temperature in oxidation for five hours before continuing the cooling. When opened, the kiln was full of blood-red Shinos. Ecstatic, I fired again, drawing a test ring every 50F during the cooling. Amazingly, these showed no fire color until the kiln had cooled to 1900°F (982°C), with the color deepening as subsequent rings were drawn.

With these results in hand, I knew that both of my glazes could give me a range of effects, from curdly-white with firecolor blushes to blood-red all over, just by treating the cooling cycle as an equally important and active part of the firing. Neither slip nor soda ash was used, only variations in the amount of oxidation during the crystal-growing part of the cooling cycle, with the color coming entirely from any impurities in the refined materials making up the glaze. In 1994, I visited Pamela Vandiver at the Smithsonian Institution's Conservation Laboratory, where she prepared samples of my Shinos for electron microscope and X-ray diffraction analysis. We have yet to fully understand the results, but we do know that the fire color is a layer of ferric microcrystals, just 20 to 30 microns thick, floating on the white glaze. Even the bloodiest Shinos were white just under the extremely thin red layer, suggesting that severe abrasion in use should be avoided; however, we have used red Shino plates at our table for 35 years without problems. Shinos in restaurant use should probably be avoided.

Later, I tried halting reduction at Cone 2, continuing in oxidation to Cone 10, then cooling slowly with the damper shut until the kiln was dark. The resultant Shinos again suggested that a considerable final period of oxidation following moderate to strong reduction allows time for the ferric microcrystalline network to form at the surface and yield the characteristic fire color that potters so love to see. Wood firing Shinos in an anagama has revealed a wider palette, since the high-calcium content in fly ash turns the normal red fire color toward greenish tones in proportion to the ash deposit. Careful placement of the pots in the anagama can yield broad chroma changes on the same piece. In addition, I use Pat's Black Beauty for contrast, pouring and trailing it over and under both Shinos.

I also work with flux-matted micro-crystalline greens and blues, copper yellows, cobalt/titania greens, and jet blacks(pg.5). All of these glazes benefit greatly from an oxidizing soak during cooling as well. Such a soak during the cooling cycle allows the glaze to out-gas and settle down, producing richer surfaces at the possible cost of a potter's sleep. I trust this account of my 40-year odyssey in trial-and-error learning with a unique kiln conveys a part of the excitement I have found each day in making my ware. The next régime to study would be cooling in reduction. Let me know if you try that! (hmurrow@efn.org)

Cheers, Hank Murrow

Recipes and Molecular Formulas:

Hank's Shino, C/10+, reduction

Nepheline Syenite..... 56.0  
Low-Melt Spodumene..... 18.0  
McNamee Kaolin..... 26.0

Add: Veegum T.....1.0 %

0.159 K<sub>2</sub> O    1.593 Al<sub>2</sub> O<sub>3</sub>    5.246 SiO<sub>2</sub>                      Si/Al ratio= 3.29/1  
0.534 Na<sub>2</sub> O    0.006 Fe<sub>2</sub> O<sub>3</sub>    0.023 TiO<sub>2</sub>  
0.041 CaO    0.067 P<sub>2</sub> O<sub>5</sub>  
0.010 MgO  
0.256 Li<sub>2</sub>O

White where thick; red where thin. Best with irony bodies and early reduction firing with a long concluding period of oxidation, or better, a soak in oxidation during cooling. Yields a very soft and fat surface with crawling. Crawls more strongly if fired soon after glazing. Note the low (3.3:1) silica to alumina ratio. Low-melt spodumene contributes phosphorus, which(as in Shaner's Red) also helps the fire color. McNamee kaolin is a Georgia clay providing a lovely blush of color in the wood fire, probably because of its iron/titania content, which is also beneficial in Shinos; Helmer kaolin can be substituted, as well as 6-Tile.

Hank's Smooth Shino, C/10+, reduction or oxidation

G200 HP Feldspar.....32.2  
Nepheline Syenite..... 35.0  
Low-Melt Spodumene..... 18.0  
McNamee Kaolin..... 13.0  
Silica.....1.0

Add: Veegum T..... 1.0 %

0.287 K<sub>2</sub> O    1.292 Al<sub>2</sub> O<sub>3</sub>    5.484 SiO<sub>2</sub>                      Si/Al ratio=4.24/1  
0.428 Na<sub>2</sub>O    0.005 Fe<sub>2</sub> O<sub>3</sub>    0.011 TiO<sub>2</sub>  
0.034 CaO    0.064 P<sub>2</sub> O<sub>5</sub>  
0.006 MgO  
0.245 Li<sub>2</sub> O

A white semi-satin where thick; red where thin. Best with irony bodies and early reduction and a long, concluding period of oxidation, or an oxidation soak during cooling. Can produce iridescence with oxides.

Pat's Black Beauty, Cone/10, oxidation or reduction

Barium Carbonate ..... 10.53 %  
Dolomite..... 21.05  
Cornwall Stone..... 47.36  
Kaolin..... 10.53  
Silica..... 10.53

Add: Red Iron Oxide..... 5.26 %

0.056 K2 O    0.309 Al2 O3    2.374 SiO2    Si/Al ratio=7.68/1  
0.087 Na2 O    0.090 Fe2 O3    0.002 TiO2  
0.376 CaO    0.005 P2 O5  
0.329 MgO  
0.001 Li2 O  
0.151 BaO

Yields a green black, shiny surface in oxidation or reduction with crystals if cooled slowly. Pour and/or trail under and over either of the Shinos to produce a variety of colors and effects. When used under Hank's Shino, black shows in the crawl lines. When used under Hank's Smooth Shino, a curdly blue-black color results.

Postscript:

Since I started cooling in oxidation some 35 years ago, initially to compensate for the faster cooling of my fiber kiln, I have seen many more benefits to this régime than mentioned here, and which probably apply to all except the very largest brick kilns. In addition, work by other potters has shown similar results beyond my expectations as elucidated by Mel and Marian. I hope Mel's free 'publication' will encourage many more to consider the cooling cycle to be as important as the heating cycle, with all of it falling into the category 'firing cycle'. I love that Marian used so much analogy in her treatise, and feel it will help others to understand what is going on in our kilns.

Here are some pics:



Hank's Shino fired in the East Creek anagama to C/12. Note effect of ash-fall.

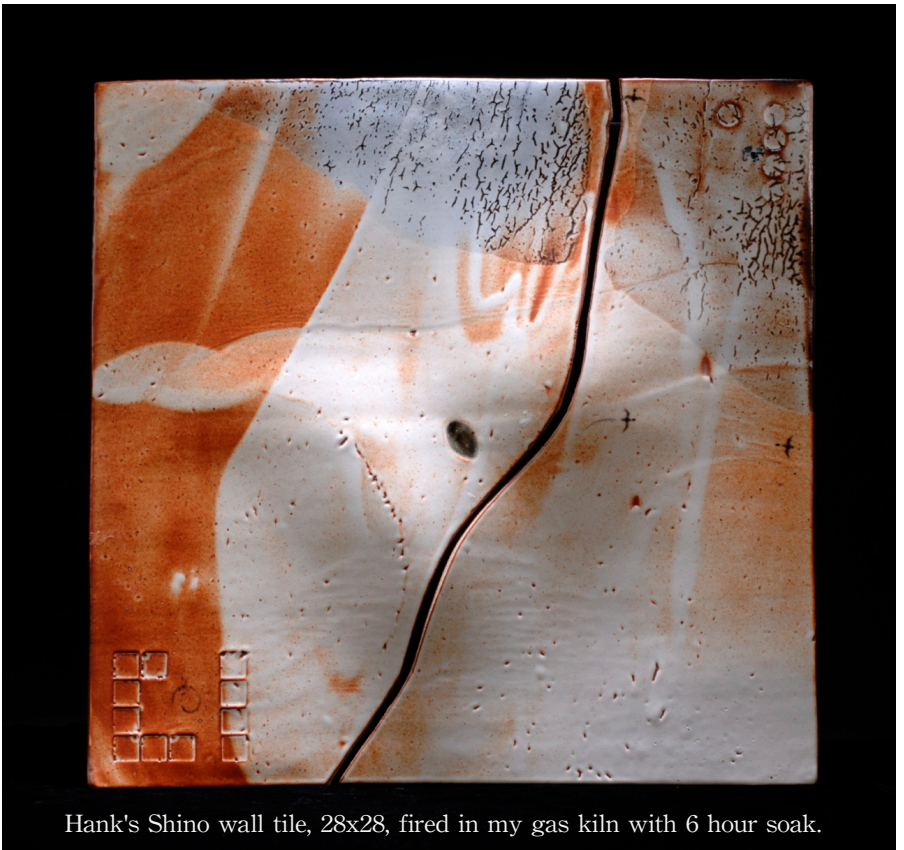


Hank's Shino over rope & shell impressions fired to C/10+ in my gas kiln with 3 Hr soak.

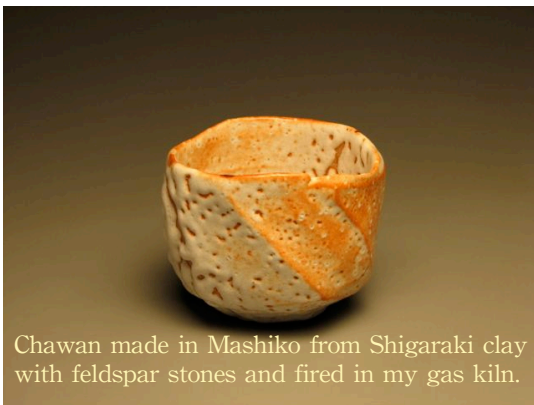




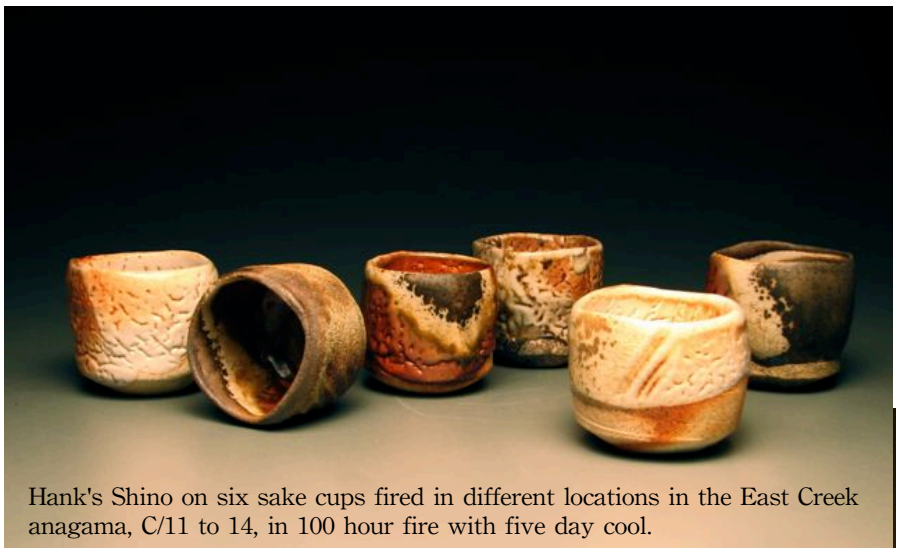
My Doorless Fiberkiln with Advancer posts and shelves. \$28 to fire with 4 hour soak.



Hank's Shino wall tile, 28x28, fired in my gas kiln with 6 hour soak.



Chawan made in Mashiko from Shigaraki clay with feldspar stones and fired in my gas kiln.



Hank's Shino on six sake cups fired in different locations in the East Creek anagama, C/11 to 14, in 100 hour fire with five day cool.

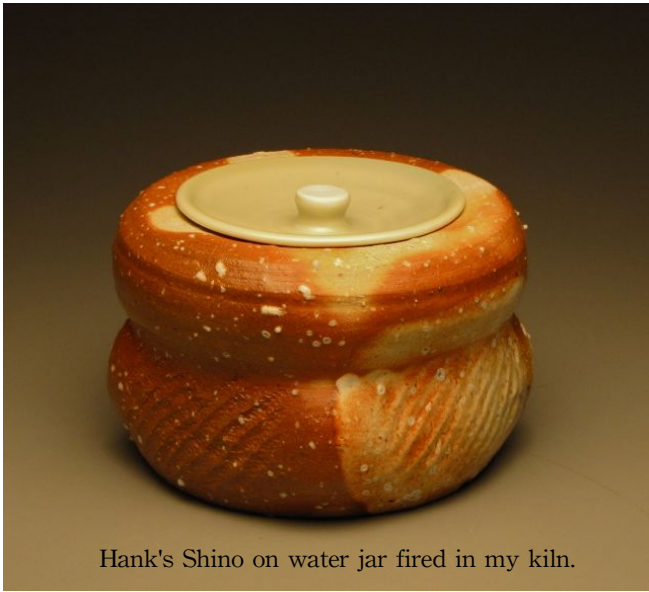


Hank's Shino on cremains jar fired in my gas kiln with four hour soak.

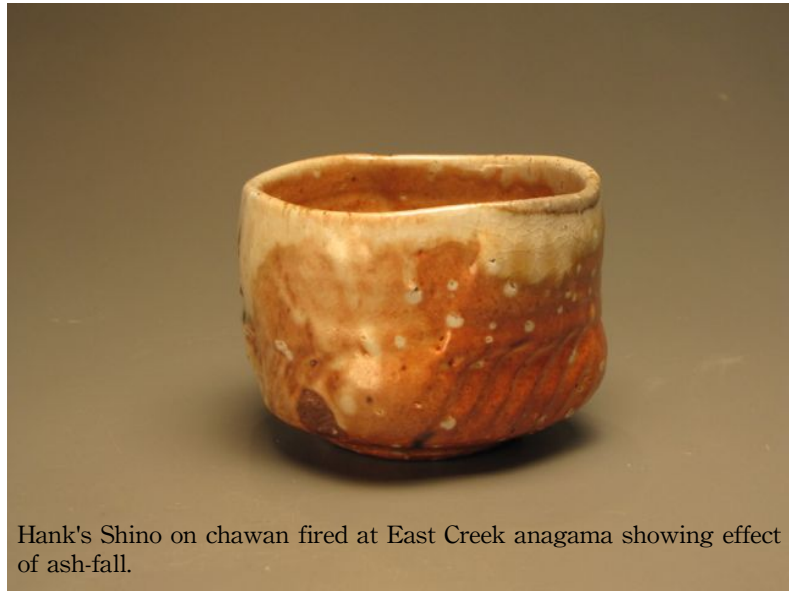


Hank's Shino on light 'tea' clay, fired in gas kiln.





Hank's Shino on water jar fired in my kiln.



Hank's Shino on chawan fired at East Creek anagama showing effect of ash-fall.



Hank's Shino w. Pat's black underneath.



Reitz Green , C/10 Ox w. Soak



Black w. Cu orange & blue on figure; fired to C/10 Ox w. 3 hour soak in Ox.



Many glazes fired in oxidation can gain richness of color from a soak in oxidation during cooling. C/10ox.



Very early Shino effort, reduced at C/08 and showing hints of firecolor.

Small hints of firecolor on the piece in my hand alerted me to the possibility that I should reduce the body earlier than C/08. I settled on C/012, and used iron-free cones to establish a setting for the Type R thermocouple in my OxyProbe for this.