is an excellent method of testing for seal point. The draw trials show the progress of glaze melting at different kiln temperatures. Typically, identical tiles are lined up on a kiln shelf and the one located closest to a peep hole large enough to allow pulling the tile out of it easily is removed. The hole is then closed and later another tile is pulled until a series of draw trials shows how much a particular glaze matures at different temperatures during the firing.

An accurate indication of kiln temperature is very helpful to successful carbon-trap firing.

Glazes for carbon trapping typically have high amounts of low-melting-point fluxes—most often sodium, but sometimes lithium, or a combination of the two. These two fluxes lower the seal point of these glazes. A soluble sodium source, usually soda ash, is also commonly used so that as the water evaporates from the glaze, it leaves a concentration of the dissolved sodium at the glaze surface, even further lowering the melting point there.

Because sodium and lithium melt at relatively low temperatures, as low as 1800°F (980°C), and most carbon trapping is done with porcelain or sometimes stoneware that is ultimately fired to cone 5–10, any glaze used must be stiff (viscous) enough that it will not run. For this reason most carbon-trap glazes have high amounts of alumina, sourced from a significant portion of clay in the recipe.

Firing for Carbon

Firing is the key to successful carbon trapping. Remember that fuel and strong reduction for at least a short period are required. The period of strong reduction must be followed by at least moderate reduction until the glaze reaches its seal point, which is what actually "traps" the carbon.

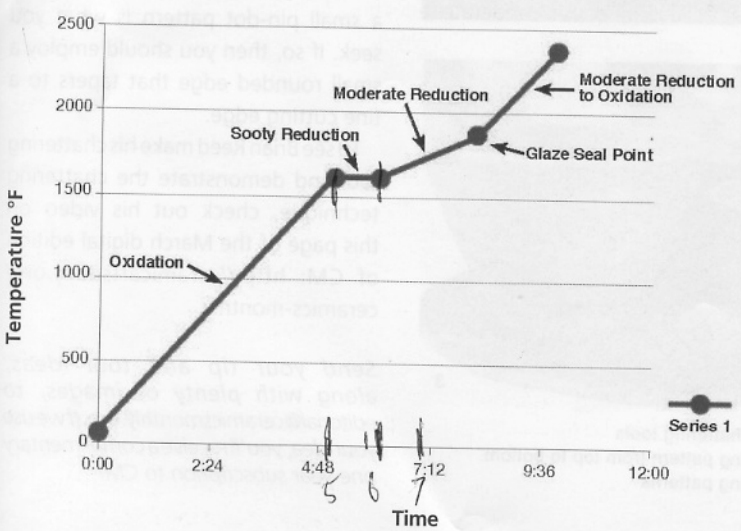
The firing schedule can be oxidation up until reduction begins, then sooty reduction, then at least partial reduction, then moderate to light reduction or even oxidation to peak temperature.

The duration and peak temperature of the sooty reduction portion of the firing is for a period of time and to a temperature judged suitable by the firer. The shift from moderate to light reduction or even oxidation at or near the seal point can emphasize the differences in the location of soluble sodium on the glaze surface. Oxidation will burn off the carbon that has not yet been trapped.

The real sweet spot in carbon-trap firing is to trap some carbon but burn off the rest and also reduce iron present in clay or glaze to produce an array of black, gray, tan, and orange hues on the ware from the single glaze used.

This is a theoretical carbon-trap firing schedule. The important features are that the kiln temperature may stop rising or even fall during sooty reduction, and that the duration of sooty reduction need not be long.

Theoretical Carbon Trap Firing Schedule



An Alternative Method

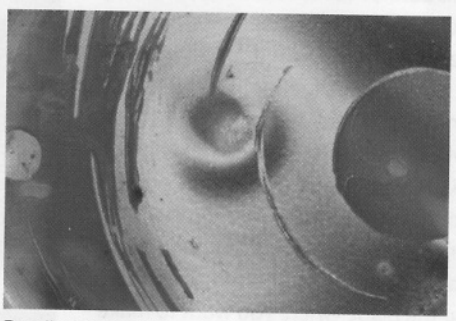
SODA-FLUXED PORCELAIN

Cone 8–14

Nepheline Syenite	24 %
SGP Ball Clay	14
Grolleg Kaolin	29
Tile 6 Kaolin	24
Silica	9
	100 %

ORANGE FLASHING SLIP

Borax	6 %
OM4 Ball Clay	42
EPK Kaolin	42
Zircopax	10
	100 %



Detail of Sam Hoffman's *Vapor Trails*, with soda-fluxed porcelain and orange flashing slip. *Photo: Bill Bachhuber.*

Both of Sam Hoffman's pieces were soda-vapor glazed in a wood-burning kiln, with heavy-reduction cooling. The soda feldspar (nepheline syenite) in the porcelain makes it more susceptible to carbon trapping, giving it a black or gray color. The flashing slip tends to resist carbon trapping, remaining orange or red as a point of contrast with the clay body. Refractory wadding placed on the pieces resists the wood ash and soda vapors, creating another layer of color and texture.