ANTIQUE AUTHENTICATION

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through science

What does it mean when we say that a clay is insensitive?

There are two main reasons for a clay to be insensitive.

- There may be insufficient quartz.
- Most, if not all, of the quartz may form a glass as a result of the high temperatures reached during firing. This is common in many types of porcelain.

To authenticate any fired ceramic, quartz and/or feldspar (the so-called TL minerals) must be present in sufficient concentrations and the object must have been fired to over 500°C (932°F) to remove the geological signal.

The situation for stoneware and porcelain is more complex because these pieces are fired to a far higher temperature than pottery.

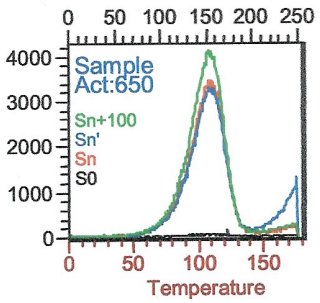
For dating, the sample must initially contain quartz grains whose diameters are at least 12microns (1micron = one thousandth of a millimetre). Due to the high temperature reached during firing, the outer portions of these quartz grains dissolve in the surrounding clay to form a glassy layer. Any remaining crystalline quartz from the original grain lies at the centre of the glassy layer.

The usual method of TL analysis is not valid for porcelain or stoneware. The only way to perform any TL dating on porcelain or stoneware is to use a method known as **pre-dose analysis** (see glow-curves below), which measures sensitivity changes in a peak at 110°C (the pre-dose peak). **Only the crystalline quartz which remains after firing gives rise to the pre-dose peak.**

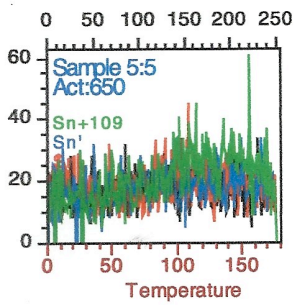
The amount of crystalline quartz remaining after firing depends on the initial concentration, the original grain size, the firing temperature, and on the length of time the object is fired.

Doreen Stoneham
Oxford Authentication Ltd

The glow-curves below are those from an ancient piece of porcelain. The TL glow-curves at 110°C show increases with each measurement.



The glow-curve below is from an insensitive piece of porcelain. The TL glow-curves at 110°C show no increase with measurement.



Shop E, G/F Po Hing Mansion / 2-8 Po Hing Fong / Sheung Wan, Hong Kong
香港上環普慶坊2-8號寶慶大廈地下E

t 電話 +852 2546 3338
f 傳真 +852 2546 1660

www.antiqueauthentication.com