The Last Chance Canyon, CA Dutch Cleaner Mine—

A Study of its Silica Gel and K-gel Mix

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The Dutch Cleanser Mine near Red Rock Canyon, CA is reported as pumicite, a fine grained, massive pumice, and sometimes as tuff. Black pumice and white pumice in infrared are very different rocks. Black pumice is closer to an obsidian glass. Usually the white pumice is highly altered with carbonate and sulfate. As for the Dutch Cleaner Mine material being tuff, this is compared to tuff related to rhyolite by the spectrum below (Figure 1).

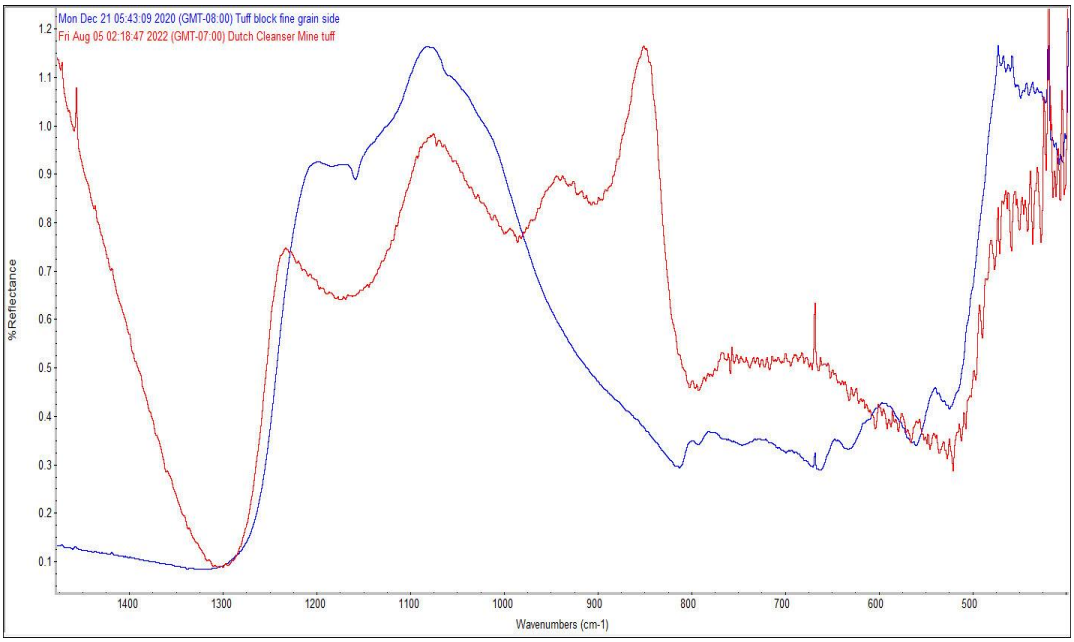


Figure 1. Fine volcanic tuff showing quartz and K-feldspar (blue spectrum) compared to the Dutch Cleaner Mine spectrum (red). They have nothing in common.

The Dutch Cleanser Mine has no spectral peak of rhyolite from quartz and feldspar minerals, but do show glass signatures of them. It matches 3 peaks in its quartet to silica gel, and one peak of potassium aluminosilicate gel (the chemical term) called potassium feldspar in mineralogy, and as a gel is abbreviated as K-gel. The highest 3 wavenumber peaks around 1000 cm-1 are silica gel peaks (S-gel), and the lowest wavenumber peak around 850 cm-1 matches a K-gel peak. We aren't matching single peaks or groups to say it has this or that mineral since in

infrared, you must match all peaks and troughs. This paper is just emphasizing key marker bands. These band identifications come from other samples of the author such as aerogel, silica gel beads, Kilauea Fissure #8 Pele's hair, and the literature, not described here, but comparison to silica gel to Dutch Cleaner material is shown below (Figure 2).

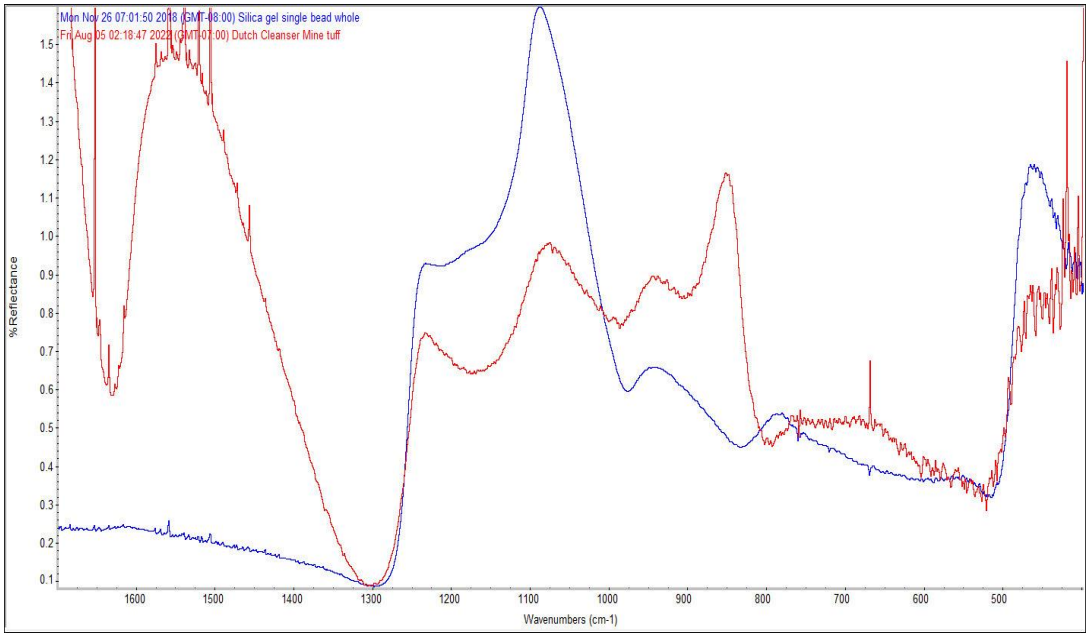
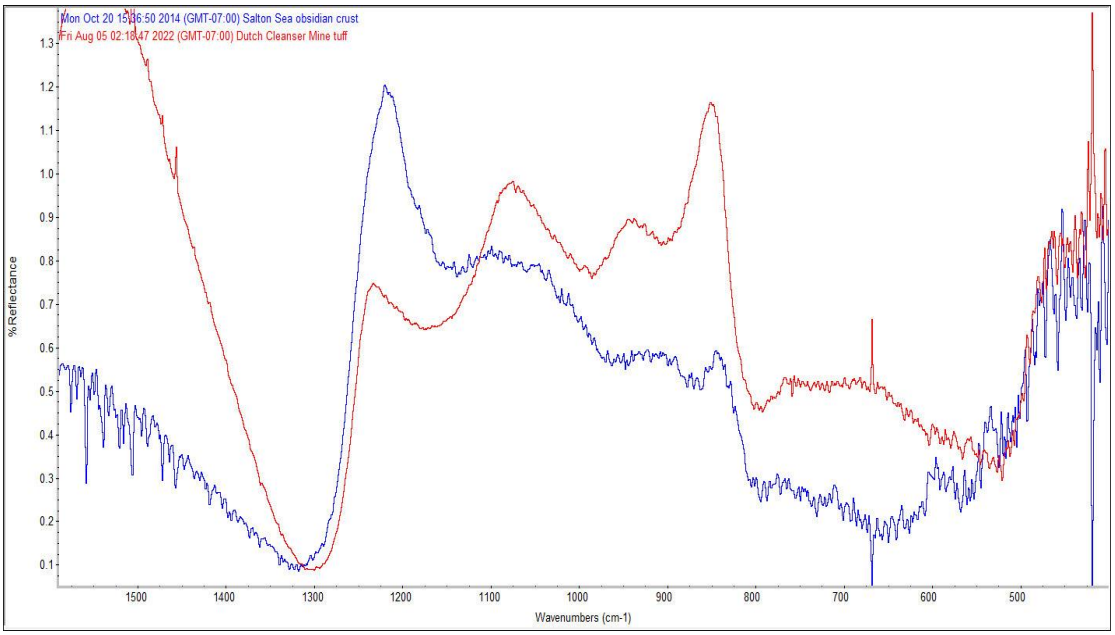


Figure 2. Silica gel bead (blue spectrum), versus Dutch Cleanser Mine material (red spectrum). 3 of the 4 bands of Dutch cleanser in the 1300-800 cm-1 region match, the right peak is a match to literature K-gel.

The Dutch Cleaners Mine contains both S-gel and K-gel, with a dominance of slightly more K-gel. By comparison in the spectrum below, the froth in Salton Sea obsidian is also a mix, with slightly more S-gel. Sloppy geology in the past may have looked at the shards and made the declaration of pumice, but the composition tells us what it really is. Particle size and shape does not determine composition. Since it is expected that this will be altered geologically quickly, these gels are only going to be found in very young flows. The Crater Lake caldera ejected its pumice over a wide region, and samples from that ejecta are also S-gel in infrared spectroscopy that matched Dutch Cleanser Mine material.



Salton Sea obsidian white crust (blue spectrum) leaning toward S-gel, and Dutch Cleanser Mine specimen (red spectrum) leaning toward K-gel. These spectra along with others, infers that there is an S-gel to K-gel solution series, geologically.