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The Influence of Sample Surface Preparation on Thermal Infrared Spectroscopy Results

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Thermal infrared spectroscopy of rocks and drill cores is becoming an increasingly mainstream method to measure and analyze big datasets in e.g. mining operations. Preliminary spectroscopic results on drill cores show that the preparation of the measured drill core surface has an influence on the resulting spectra. Furthermore modern core imaging methods measure spectral information with pixels that approach the size of individual crystals in a fabric. Crystallographic orientation of the individual minerals in the fabric will influence the spectra measured and can deteriorate the interpretation of the results.

In this paper we will present preliminary results of a study on the influence of sample preparation methods on the thermal infrared spectra, and as a consequence, on the quantitative mineralogic interpretation of these spectra. Thermal infrared spectra of split cores will be compared to those on sawed cores; and to those after polishing under different grit sizes. Differences are compared and explained with surface roughness observations under scanning electron microscopy (SEM), as well as bulk mineralogy from quantitative x-ray diffraction (XRD) analysis. The results of the study will show typical ranges of signal deterioration introduced by the sample preparation method, and an attempt is made for a “best practice” paths to create consistent and mineralogically correct results from TIR spectroscopy.