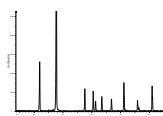




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Laboratory Unit



X-Ray Diffraction

Att: F. Roelofse
CGS Laboratory, Petrography for *M. Telling*

Mineralogical results

RE: Our JOB No. 08-646
Project No. 5034

14 October 2008

XRD analysis of 1 sample, labeled Michael, was performed and the results are listed below as semi-quantitative estimates of phase abundances expressed in weight percentages:

- 40% Cordierite
- 40% Quartz
- 8% Plagioclase
- 8% Kaolinite
- 5% Illite/Smectite interstratification.

Note:

- results relate only to items tested
- samples will be discarded after 3 months in storage

Quartz is the second most abundant mineral in Earth's continental crust, composed of silicon and oxygen atoms (SiO₂) in a continuous framework. It is known for its hardness, chemical resistance, and piezo-electric properties. It exists in various forms—including macrocrystalline (amethysts, citrine) and cryptocrystalline (agate, flint)—used widely in jewelry, electronics, and construction

Cordierite is a magnesium-iron-aluminum silicate mineral, known for its strong pleochroism (displaying blue-violet to yellow colors depending on light angle) and hardness of 7–7.5. It is primarily found in high-grade metamorphic rocks, such as hornfels and gneiss, and is frequently used in ceramics, kiln furniture, catalytic converters, and as the gemstone Iolite.

Plagioclase is the most common group of rock-forming silicate minerals in Earth's crust, forming a continuous solid solution series between Na-rich Albite and Ca-rich Anorthite.

Samples scanned from 2 to 70° 2θ CuKα radiation at a speed of 0.02° 2θ steps size/0.5 sec, LYNXEYE detector and generator settings of 40 kV and 40mA. Phase concentrations are determined as semiquantitative estimates, using relative peak heights/areas proportions (Brice, 1985).

These triclinic feldspars are vital for identifying igneous and metamorphic rock origins, featuring high-temperature crystallization and diagnostic twinning.

Kaolinite is a soft, white, layered silicate clay mineral formed by the chemical weathering of aluminum-rich rocks like feldspar. It is widely used in ceramics, paper coating (for smoothness/brightness), pharmaceuticals, and cosmetics due to its inert and absorptive properties. Found globally, major deposits exist in the USA (Georgia/South Carolina), China, Brazil, and the UK.

Illite/smectite (I/S) interstratification represents a mixed-layer clay mineral system, common in sedimentary basins, where illite and smectite layers are stacked together. This transformation process, known as illitization, involves smectite absorbing potassium and losing water, often transforming into ordered ($R=1, 2$) or random ($R=0$) sequences indicating diagenetic grade.