

14.2 Dissolved Constituents in Water from Hydrous Retort Experiments

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Hydrous retort experiments were conducted over a range of 310 to 350°C for 72 hours. A second set of experiments was conducted at 350 °C from 3 to 14 days. The retort vessels were cooled to ambient temperature and the retort waters were collected and analyzed to determine the dissolved inorganic and organic constituents. The waters were all circum-neutral and specific conductivities were ~6,500 uS/cm. The waters are dominantly Na-HCO₃ waters with minor amounts of Ca and Mg. The waters did not contain any measurable nahcolite as determined by powder x-ray diffraction. Silica concentrations were as high as 196 mg/L. The elevated Na and Si concentrations may be the result of the dissolution of analcime and subsequent formation of the trioctahedral clay, saponite, as supported by powder x-ray diffraction. Both SO₄²⁻ and NO₃⁻ were observed in the retort waters. Elements of concern with elevated concentrations included Hg, As, B, and F. Dissolved organics determined from Gas Chromatography/Mass Spectrometry were dominated by acyclic and cyclic ketones. Other constituents include phenols, alcohols, a thiol, and a heterocyclic nitrogen compound. The changes in the concentrations of the dissolved constituents with time and temperature are discussed.