

Low Temperature Experimental Investigation of the Effect of High pH NaOH Solutions on the Opalinus Shale, Switzerland

J. A. Chermak

Mineralogisch-Petrographisches Institut, Universität Bern, Baltzerstrasse 1, CH - 3012 Bern, Switzerland

Abstract: Batch reactor experiments were performed at 150°C, 175°C, and 200°C to determine the effect of high pH NaOH solutions on the mineralogy of the Opalinus shale. In these experiments, the change in solution quench pH at 25°C, solution composition, and mineralogy were monitored as a function of time for up to ≈40 days. Runs were performed in 50 ml titanium hydrothermal reactor vessels. Each reactor was charged with 0.5–5.0 g of the 80–200 mesh size fraction of Opalinus shale, and 25 ml of solution (0.1 and 0.01 M NaOH). The general sequence of reaction products observed under these high pH conditions include first the formation of analcime, followed by vermiculite, and finally Na-rectorite formation.

Key Words: Analcime • Experimental investigation • High pH • Na-rectorite • Opalinus shale • Vermiculite

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