

CHROMIUM RICH SMECTITES FROM JORDAN: A SINK FOR HAZARDOUS ELEMENTS OF A HIGH PH PLUME

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A green earthy chromium rich dioctahedral smectite is widely distributed in Jordan (Khoury and Abu-Jayyab, 1995). Figure 1 is a SEM photo that shows the interconnecting nature of the Cr-rich clay. The green clay mineral is associated with marbles and travertines in central Jordan and in Suweileh area near Amman. A wide range of chromium substitution in the octahedral layer of smectites is indicated in samples from the different localities. The chromium rich smectites followed the precipitation of calcite and preceded the precipitation of opaline silica from highly alkaline paleogroundwater. Figure 2 shows SEM photo indicating the sequence of precipitation. These waters were evolved as a result of retrograde alteration and hydration reactions in the metamorphic zone. The secondary mineral precipitation followed the thermal metamorphic event of the bituminous marls (Khoury and Nassir 1982 a & b).

The travertine in central Jordan indicates a long-term analogue of carbonation and remobilization of silica in cementitious barriers for radioactive waste repositories. The presence of Cr-rich smectites and relatively high levels of U in the associated opaline silica may suggest the use of central Jordan outcrops as analogues with the repository disturbed zone. Figure 2 shows SEM photo indicating the sequence of precipitation. These waters were evolved as a result of retrograde alteration and hydration reactions in the metamorphic zone. The secondary mineral precipitation followed the thermal metamorphic event of the bituminous marls (Khoury and Nassir 1982 a & b).

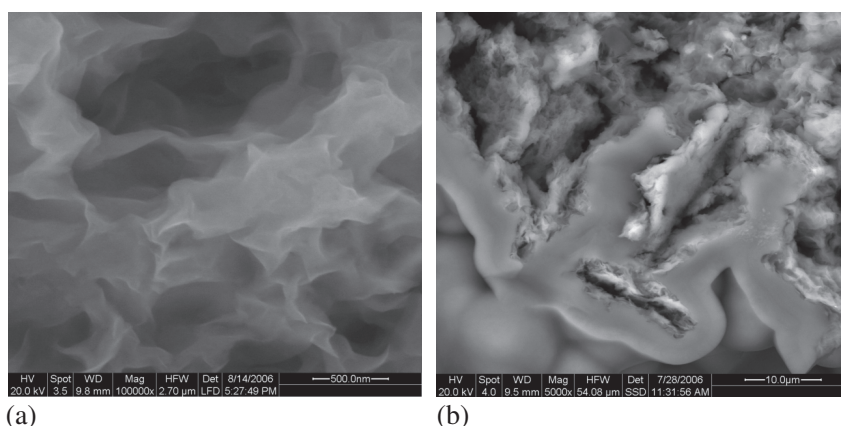


Figure 1: SEM photographs indicating Cr-rich smectite (a) and the sequence of precipitation. (b)

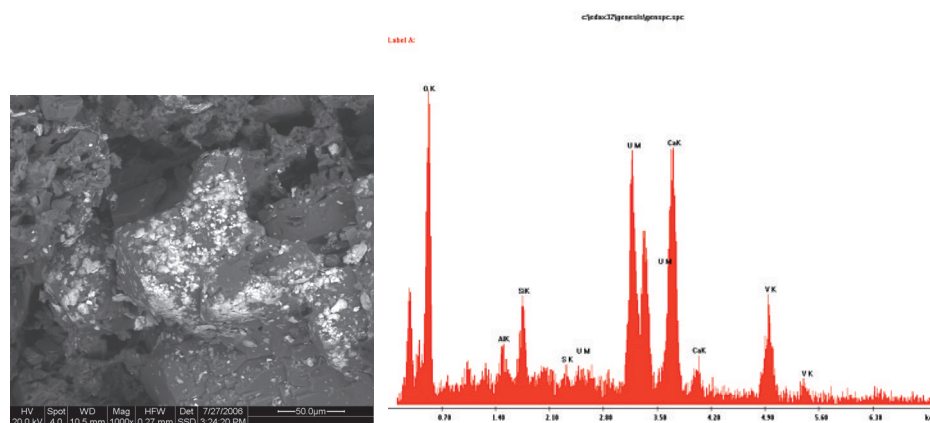


Figure 2: SEM photograph and EDX spectra of U and V in travertine.

References:

- Khoury, H. N., and Nassir, S., 1982a. A discussion on the origin of Daba – Siwaqa marble, *Dirasat*, 9 : 55-56, University of Jordan.
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