Iron Mobility in Desert Sandstone Aquifers: The Possible Role of Siderite

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Background

Jordanians and a large number of refugees are drinking radium-contaminated water from a sandstone aquifer. The problem is that this water passed through sandstone of the Disi Formation only after carbon dioxide and methane had bleached the sandstone, dissolving the Iron-oxide coatings and liberating heavy metals and radionuclides. The Iron that once coated the grains migrated to form Iron bands in the lower Um Ishrin Formation.

Purpose and Hypothesis

The major practical significance of this study involves water quality. The movement of Iron sandstone aquifers can drastically change groundwater chemistry; understanding how and when this movement takes place will help in locating safe supplies of drinking water.

Hypothesis: The rhombic, Iron-rich structures in the Jordanian sandstones are the altered remains of now-dissolved siderite crystals. It is important to figure out the elemental composition of the possible pseudomorphs, and to get a better look at their form.

Materials and Methods

Scanning Electron Microscope (SEM)- Nanoscience facilities at Jorgensen Hall

Results

Qualitative Data

Quantitative Data

Feldspar altered to Kaolinite books. Distribution of Iron in rhombic zones is consistent with siderite origin.

Conclusion

• Feldspar altered to Kaolinite books.
• Distribution of Iron in rhombic zones is consistent with siderite origin

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