Monday, May 21, 2001
GEOCHEMICAL ASPECTS OF SUSTAINABLE ENERGY UTILIZATION:
RADIOACTIVE WASTE
3:55 p.m. Commonwealth Room

Chairs: D. J. Wesolowski
D. R. Cole

Langmuir D. * [KEYNOTE]
_The Crucial Role of Geochemistry in the Geologic Disposal of High Level Nuclear Wastes_ [#3037]
This talk will consider important contributions of geochemistry to site selection and characterization and to predicting the performance of geological repositories for high level nuclear wastes.

Ewing R. C. *
Immobilization of actinides in highly durable materials may be a better, more certain strategy for isolation of long-lived actinides than reliance on geologic disposal. A number of materials can effectively limit release of Pu: zirconia, zircon and Gd-zirconate pyrochlore.

Apted M. J. * McKinley I. G. Umeki H.
_Geochemical Research Priorities for Nuclear Waste Disposal: Perspective from International Repository Programs_ [#3153]
Key geochemical data for assuring long-term safety of nuclear waste repositories include characterization of rock-water reactions, performance of engineered barriers under repository conditions, and fate of radioelements in the natural environment.

Navrotsky A. *
_Energetics of Crystalline Phases Related to Nuclear Waste Disposal_ [#3259]
Modeling the fate of nuclear waste glass and ceramics requires knowledge of the thermodynamic behavior both of the waste forms and of any products (leach layers, precipitates) formed during their long term interaction with the aqueous geochemical environment.

Hoskin P. W. O. * Burns P. C.
_Experimental Evidence for Retardation of {}^{135}\text{Cs} Mobility in a Nuclear Repository by Ion Exchange into Compregnacite_ [#3828]
Alteration of spent nuclear fuel will result in a complex suite of uranyl minerals. Here, we demonstrate that the mobility of {}^{135}\text{Cs} may be retarded in the repository by ion-exchange with compreignacite.

Conrad M. E. * Sonnenthal E. L.
_Isotopic Constraints on the Thermochemical Evolution of the Drift-Scale Heater Test at Yucca Mountain_ [#3722]
The isotopic compositions of gas and water samples from the underground Drift-Scale Heater Test at Yucca Mountain have been analyzed. These data are used to constrain the source of the carbon dioxide in the pore gas and the movement of porewater.

Sonnenthal E. L. * Spycher N. F. Apps J. A. Conrad M. E.
_A Conceptual and Numerical Model for Reaction-Transport Processes in Unsaturated Fractured Rock at Yucca Mountain: Model Validation Using the Drift Scale Heater Test_ [#3814]
A conceptual and numerical model to predict the evolution of the geochemical system around the potential nuclear waste repository in the unsaturated zone at Yucca Mountain.
Wilson N. S. F. * Cline J. S. Amelin Y. V.

Fluid Inclusion Microthermometry and U-Pb Dating Constraints to Fluid Movement Through the Potential Yucca Mountain Nuclear Waste Repository [#3724]

Paragenetic, fluid inclusion, and U-Pb data indicate that fluids of 35–81°C were present at the Yucca Mountain site older than 1.9–5.3 Ma, during cooling of the tuff sequence. Data indicate that the site has been stable for millions of years.