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SPECIAL COLLECTION: APATITE: A COMMON MINERAL, UNCOMMONLY VERSATILE

Radionuclide removal by apatite

MARK J. RIGALI^{1,*}, PATRICK V. BRADY¹, AND ROBERT C. MOORE¹

¹Sandia National Laboratories, P.O. Box 5800, Albuquerque, New Mexico 87185-0754, U.S.A.

ABSTRACT

A growing body of research supports widespread future reliance on apatite for radioactive waste cleanup. Apatite is a multi-functional radionuclide sorbent that lowers dissolved radionuclide concentrations by surface sorption, ion exchange, surface precipitation, and by providing phosphate to precipitate low-solubility radionuclide-containing minerals. Natural apatites are rich in trace elements, and apatite's stability in the geologic record suggest that radionuclides incorporated into apatite, whether in a permeable reactive barrier or a waste form, are likely to remain isolated from the biosphere for long periods of time. Here we outline the mineralogic and surface origins of apatite-radionuclide reactivity and show how apatites might be used to environmental advantage in the future.

Keywords: Apatite, apatite, radionuclides, radionuclides, sorption, remediation