

Geomicrobiological controls on the mobility of radionuclides in the subsurface settings

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It is becoming increasingly clear that microorganisms play major roles in controlling the mobility and fate of radionuclides in the environment. Although the reductive precipitation of many radionuclides from the high-level nuclear waste are thermodynamically favorable and assumed to occur in the multi-barrier system, the results from the observations of natural settings as well as recent studies on microbe-radionuclide interactions suggest that the reductive precipitation of radionuclides is strictly controlled by kinetic factors. Some natural phenomena, which exemplify the kinetic controls on the reduction of radionuclides, will be presented. In addition, there appear to be microbial and chemical processes by which reducing radionuclide-bearing minerals are being oxidized and subsequently dissolve under reducing conditions. These processes will be discussed, as well.