

Colloidal ferrihydrite retards the appearance of Pu on the Earth's surface

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Radioactive wastes from nuclear power plants must be disposed of safely. A large amount of Pu in the wastes is sorbed to colloidal ferrihydrite and moves in groundwater. This paper describes the behavior of Pu sorbed to colloidal ferrihydrite in nuclear waste disposal sites. When the concentration of ferrihydrite is higher than 10^{-5} mol Fe /L, most Pu is sorbed to the ferrihydrite. Ferrihydrite persists in groundwater as long as nitrate is present. When the filtration effect of geologic media is small, the gravity moves colloidal ferrihydrite to deep underground; the velocity is 0.12 m/year when the size of ferrihydrite is 70 nm. When the filtration effect is large, ferrihydrite is not transported further. In both the cases, ferrihydrite retards the appearance of Pu on the Earth's surface.

Keywords: colloid, ferrihydrite, plutonium, transport of radionuclides, gravity effect, sorption