

Enhancement of the Extraction of Uranium from Seawater

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ABSTRACT:

Development of efficient methods to recover uranium from seawater is very important since uranium resources are only sufficient for 100-200 years of use and uranium mining poses serious environmental problems. The objective of the present proposal is to develop and optimize novel adsorbents for uranium based on radiation-induced grafting of organic phosphates onto polymers with very large surface area. Grafting is performed in water, thus providing a “green chemistry” route to the production of the new adsorbents. Preliminary results indicate that the performance of the phosphate-based adsorbents is substantially better than that of existing materials. The proposed research will focus on the attainment of very high loadings (>6-7%), rapid adsorption and desorption kinetics (<10 hours for each step), and multiple cycles of effective reusability (>20 cycles with little change in effectiveness, far better than existing adsorbents). These targets will be achieved through a combination of experimentation, using real ocean water, with mechanistic analysis, and the results will provide a solid basis for large-scale demonstration of the performance of the new adsorbents in ocean environments.