Microfluidic Generation of Prussian blue-laden Magnetic Micro-adsorbents for Cesium Removal

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Here, we designed and synthesized a recoverable multifunctional adsorbent using a microfluidic system and evaluated the removal performance of the smart adsorbent toward radioactive cesium. Prussian blue-laden magnetic micro-adsorbents with uniform morphology were generated via two-step sequential procedures using a glass capillary microfluidic system, followed by chemical co-precipitation. The cesium removal efficacy of the PB-MNPs-MAs was analyzed based on Langmuir and Freundlich isotherms by controlling adsorption parameters such as adsorbent size, initial cesium concentration, and contact time. Additionally, the PB-MNPs-MAs were recovered from wastewater within 5 s under a static magnetic field, indicating their great potential for magnetic actuation. We believe that our PB-MNPs-MAs can encapsulate nano-functional adsorbents and prevent actuation, making them promising for environmental remediation and especially for removal of radionuclides.