

Highly Stable Chitosan–Graphene Oxide Composite Decorated with Prussian Blue Nanoparticles for Selective Radioactive Cesium Removal

곽철환, Muruganantham Rethinasabapathy, 강성민, 허윤석[†]
인하대학교
(yunsuk.huh@inha.ac.kr[†])

In this work, a Prussian blue (PB)/graphene oxide (GO)/chitosan (CS) organic–inorganic composite was successfully synthesized and utilized as an adsorbent for the selective removal of cesium (Cs^+) ions. Taking the advantage of synergistic effect GO, CS and PB nanoparticles, the PB/GO/CS composite exhibited maximum adsorption capacity of 48.35 mg g^{-1} for Cs^+ ions. In the presence of competitive monovalent cations (K^+ and Na^+), PB/GO/CS showed excellent selectivity (86%) for Cs^+ ions. This enhanced adsorption capacity with high selectivity of PB/GO/CS for Cs^+ ions may have been attributed to (i) the presence of carboxylic, hydroxyl and amino functional groups on GO/CS, and (ii) the trapping of Cs^+ ions by the voids of the FCC–structured PB lattice whose size is equivalent to the hydration radius of Cs^+ ions. Due to its low–cost, facile preparation, high adsorption capacity, and superior Cs^+ ions selectivity, PB/GO/CS is a promising material for the selective removal of the Cs^+ ions from the environment and for protecting eco–systems from the radiation hazards.