

Layer-Structured POSS-incorporated Fe-Aminoclay/Carboxymethyl Cellulose Adsorbent for Cationic Dyes and Radioactive Cesium

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

Multifunctional Fe-aminoclay (FeAC)/carboxymethyl cellulose (CMC)/polyhedral oligomeric silsesquioxane (POSS) composite (FeAC/CMC/POSS) with layered structure was successfully synthesized and utilized as adsorbent for the removal of cesium ions (Cs^+) and cationic dyes methylene blue (MB) and chrysoidine G (CG). The FeAC/CMC/POSS exhibit excellent adsorption capacities for Cs^+ ions, MB and CG of 152, 438 and 791 mg g^{-1} , respectively. The unprecedented adsorption capacities for Cs^+ ions, MB and CG may be attributed to (i) the layered morphology of the composite and $-\text{NH}_2$ groups on clay surface; (ii) existence of $-\text{COO}^-$ and $-\text{OH}^-$ groups on the CMC backbone. More importantly, the incorporation of POSS increases the interlayer spacing of Fe-aminoclay providing room for the encapsulation of Cs^+ ions and dye molecules. Owing to superior adsorption capacity, the devised FeAC/CMC/POSS composite could be a promising organic-inorganic material used to cost-effectively remove the multitude of environmental pollutants.