

Layered Structure of
Fe-Aminoclay/Carboxymethyl Cellulose/POSS Composite for the Removal of Radioactive
Cesium and Cationic Dye

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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 -NH₂ groups on clay surface; (ii) existence of -COO⁻ and -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.