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Gemini-Surfactant Directed Facile Synthesis of Mesoporous Aluminophosphates and their Application in Ferritin Adsorption

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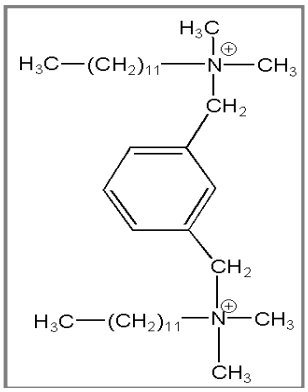
ABSTRACT

The usefulness of dicationic Gemini surfactant (DGS) as structure-directing-agent/ template for the facile synthesis of mesoporous aluminophosphates (AlPOs) via both hydrothermal and microwave heating methods was described. An easy extraction of template with ethanolca used a structural transformation in the crystalline phases of AlPOs from lamellar to hexagonal. The morphology, pore-structures, surface properties of as-synthesized and template-free (porous) AlPOs were studied by SEM, XRD, TGA and adsorption-desorption measurements respectively. The local environment around aluminium, phosphate and template in AlPOs were studied by Raman spectroscopy. As the AlPOs contains relatively large pores, immobilization of ferritin protein via adsorption was investigated to design new artificial bio-sensors.

Graphical Abstract



Gemini Surfactant with aryl spacer

Keywords: Gemini Surfactants, Porous Aluminophosphates, Protein Adsorption, Grafter Bio-sensors