
Title: Facile synthesis of functionalized ionic surfactant templated mesoporous silica for incorporation of poorly water-soluble drug

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Abstract: The present paper reported amino group functionalized anionic surfactant templated mesoporous silica (Amino-AMS) for loading and release of poorly water-soluble drug indomethacin (IMC) and carboxyl group functionalized cationic surfactant templated mesoporous silica (Carboxyl-CMS) for loading and release of poorly water-soluble drug famotidine (FMT). Herein, Amino-AMS and Carboxyl-CMS were facilely synthesized using co-condensation method through two types of silane coupling agent. Amino-AMS was spherical nanoparticles, and Carboxyl-CMS was well-formed spherical nanosphere with a thin layer presented at the edge. Drug loading capacity was obviously enhanced when using Amino-AMS and Carboxyl-CMS as drug carriers due to the stronger hydrogen bonding force formed between surface modified carrier and drug. Amino-AMS and Carboxyl-CMS had the ability to transform crystalline state of loaded drug from crystalline phase to amorphous phase. Therefore, IMC loaded Amino-AMS presented obviously faster release than IMC because amorphous phase of IMC favored its dissolution. The application of asymmetric membrane capsule delayed FMT release significantly, and Carboxyl-CMS favored sustained release of FMT due to its long mesoporous channels and strong interaction formed between its carboxyl group and amino group of FMT.