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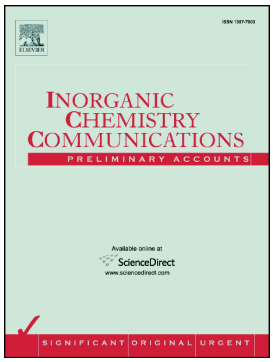

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Metal-organic framework MIL-101(Fe)-NH_2 functionalized with different long-chain polyamines as drug delivery system

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Abstract: Mesoporous metal-organic framework MIL-101(Fe)-NH_2 was prepared and post-synthetically modified with amines of different chain lengths: ethylenediamine (*en*) and 1,2-bis(3-aminopropylamino)ethane (*bap*). Three prepared samples (MIL-101(Fe)-NH_2, MIL-101(Fe)-NH_2-*en*, MIL-101(Fe)-NH_2-*bap*) were studied as carriers for drug delivery of non-steroidal antiinflamatory drug naproxen. The modification of MIL-101(Fe)-NH_2, encapsulation of the drug and stability of the carriers were monitored by the combination of different analytical techniques such as elemental analysis (EA), infrared spectroscopy (IR), thermogravimetry (TG), measurements of zeta potential (ζ), high-energy powder X-ray diffraction (HE-PXRD), ^{1}H-NMR spectroscopy and N_2 adsorption measurements. The naproxen release studies were performed into two simulated body fluids with different pH: the simulated gastric fluid (pH = 2) and the simulated intravenous solution (pH = 7.4). Results of naproxen release clearly showed the impact of pH and amine functional groups on the naproxen release. The number of amine groups in *en* and *bap* influenced the release process more significantly in solution with pH = 7.4 than pH = 2.

Keywords: MIL-101(Fe)-NH_2, post-synthetic modification, polyamines, naproxen, drug delivery