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Alkali activation of halloysite for adsorption and release of ofloxacin

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Abstract

Halloysite nanotubes are promising vehicles for the controlled release of drug molecules. Here, we systematically investigated the effects of alkali activation on the physicochemical properties, structure and morphology of halloysite nanotubes by XRD, FTIR, SEM and TEM, etc. Afterwards, the adsorption and *in vitro* release properties of halloysite for cationic ofloxacin (OFL) were evaluated. The results indicate that alkali activation dissolves amorphous aluminosilicate, free silica and alumina, which results in the increase in pore volume and pore size. OFL is adsorbed onto halloysite via electrostatic interaction and complexation. Alkali activation could increase the adsorption capacity of halloysite for OFL and prolong release of the adsorbed OFL compared with the natural halloysite. Thus, alkali activation of halloysite is an effective protocol to improve the adsorption and prolong release for cationic drug molecules.

Key words: Halloysite, Alkali activation, Adsorption, Controlled release, Ofloxacin