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Nanohydrogel Formation within the Halloysite Lumen for Triggered and Sustained Release

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Abstract

© 2018 American Chemical Society. An easy strategy to obtain nanohydrogels within the halloysite nanotube (HNTs) lumen was investigated. Inorganic reverse micelles based on HNTs and hexadecyltrimethylammonium bromides were dispersed in chloroform, and the hydrophilic cavity was used as a nanoreactor to confine the gel formation based on alginate cross-linked by calcium ions. Spectroscopy and electron microscopy experiments proved the confinement of the polymer into the HNT lumen and the formation of calcium-mediated networks. Biological tests proved the biocompatibility of the hybrid hydrogel. The nanogel in HNTs was suitable for drug loading and sustained release with the opportunity of triggered burst release by chemical stimuli. Here, we propose a new strategy based on inorganic reverse micelles for nanohydrogel formation, which are suitable for industrial and biological applications as well as for selective and triggered adsorption and/or release.

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