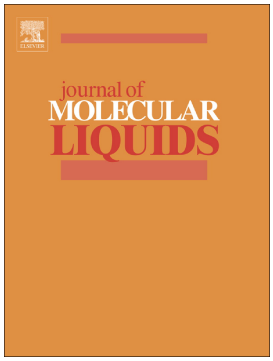

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Enhanced properties of tea residue cellulose hydrogels by addition of graphene oxide

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Abstract

Hydrogels based on tea residue cellulose and graphene oxide were prepared by a homogeneous mixture of tea cellulose and graphene oxide in ionic liquid 1-allyl-3-methylimidazolium chloride. The prepared composite hydrogels of graphene oxide/tea cellulose were characterized by X-ray diffraction, Fourier transform infrared, thermogravimetry analysis and texture profile analysis. The effect of graphene on methylene blue adsorption capacity of the prepared hydrogels was also investigated. After the addition of graphene oxide, the hydrogels showed higher thermal stability and enhanced textural property. The weight loss peak was shifted from 280 ℃ to 320 ℃, and the values of hardness, fracturability and gumminess were 12.7, 4.1 and 17.8 times respectively of the undoped tea cellulose hydrogel. As an absorbent, the graphene oxide/tea cellulose hydrogels had certain adsorption capacity (46.35 mg/g) and adsorption ratio (92.7%) for methylene blue and conformed with pseudo-second-order kinteic model.

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