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Characteristics and Magnetic Properties of Anchored Fe_3O_4 Nanoparticles in Bacterial Cellulose Scaffold

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In this work, bacterial cellulose (BC) was biosynthesized by *Glucanobacter xylinum* bacteria. Fe_3O_4 nanoparticles under different concentrations were ex-situ impregnated into the BC structure. The BC pellicles in both never-dried and freeze-dried states were used as the templates to form BC- Fe_3O_4 nano-composites. Morphological studies of the samples indicated that the 3-dimensional networks of fine fiber structure were enveloped by Fe_3O_4 nanoparticles. Moreover, the Fe_3O_4 nanoparticle was dispersed without any obvious agglomeration. The FTIR and XRD analysis showed that both never-dried and freeze-dried samples have almost similar results. Nevertheless, the saturation magnetization (M_s) of the never-dried samples was found to be higher than the freeze-dried samples, at the same Fe_3O_4 concentration. It was attributed to infiltration ability of the nanoparticles in the never-dried environment.

Keywords: bacterial cellulose; nanoparticles; characteristics; magnetic properties

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