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## Characteristics and Magnetic Properties of Anchored $\text{Fe}_3\text{O}_4$ Nanoparticles in Bacterial Cellulose Scaffold

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In this work, bacterial cellulose (BC) was biosynthesized by *Glucanobacter xylinum* bacteria.  $\text{Fe}_3\text{O}_4$  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- $\text{Fe}_3\text{O}_4$  nano-composites. Morphological studies of the samples indicated that the 3-dimensional networks of fine fiber structure were enveloped by  $\text{Fe}_3\text{O}_4$  nanoparticles. Moreover, the  $\text{Fe}_3\text{O}_4$  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  $\text{Fe}_3\text{O}_4$  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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