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Liquid absorption using 3D carbon nanofiber scaffolding derived from bacterial cellulose

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ABSTRACT
3D carbon nanofiber scaffolding was produced from the pyrolysis of freeze-dried (FD) bacterial cellulose (BC). The thermogravimetry and differential thermal analysis (TG/DTA) showed the weight loss of BC during the pyrolysis process. The X-ray diffraction technique showed the high crystallinity of the FD-BC and the high amorphousness of the carbon nanofibers. Both FD-BC and the pyrolyzed carbon nanofibers consisted of tiny fibers with the size of<100 nm. The liquid absorption capacity using FD-BC and carbon nanofibers was tested by measured the weight before and after absorption. It was found that the FD-BC was good for water absorption due to the hydrophilic nature of the sample. For the organic solvent, ethanol, methanol, benzene, and palm oil, the hydrophobic carbon nanofibers had the absorption capacity of nearly hundred times of their own weight.

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