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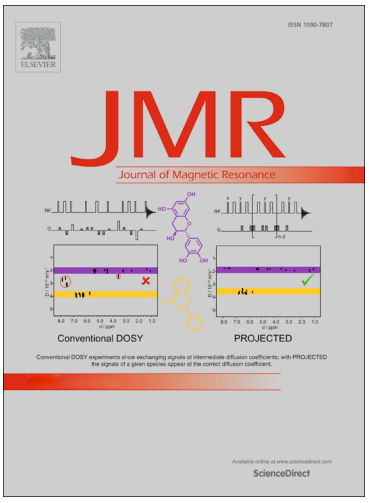

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Tissue-Susceptibility Matched Carbon Nanotube Electrodes for Magnetic Resonance Imaging

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Abstract

Test disk electrodes were fabricated from carbon nanotubes (CNT) using the Carbon Nanotube Templated Microfabrication (CNT-M) technique. The CNT-M process uses patterned growth of carbon nanotube forests from surfaces to form complex patterns, enabling electrode sizing and shaping. The additional carbon infiltration process stabilizes these structures for further processing and handling. At a macroscopic scale, the electrochemical, electrical and magnetic properties, and magnetic resonance imaging (MRI) characteristics of the disk electrodes were investigated; their microstructure was also assessed. CNT disk electrodes showed electrical resistivity around 1 Ω-cm, charge storage capacity between 3.4 mC/cm^2 and 38.4 mC/cm^2, low electrochemical impedance and magnetic susceptibility of -5.9 to -8.1 ppm, closely matched to that of tissue (~-9 ppm). Phantom MR imaging experiments showed almost

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