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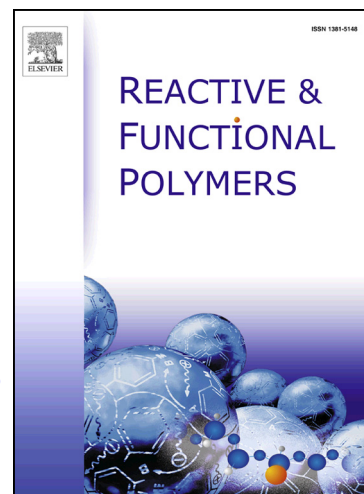
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## Stimuli Responsive Carbon Nanocomposite Hydrogels with efficient conducting properties as a precursor to bioelectronics

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### Abstract

Stimuli responsive conducting carbon nanocomposite hydrogels were synthesized from Glycerol methacrylate, Ethylene glycol methacrylate and Diethylene glycol methacrylate by thermal polymerization techniques. Carbon nanoparticles of size <50 nm were incorporated into the polymer at a concentration of 0.005% (w/w) during synthesis. The hydrogels were characterized by Fourier Transform-Infrared Spectroscopy, Thermogravimetric analysis, Scanning Electron Microscopy techniques and X-Ray Diffraction study. The hydrogels have excellent absorption properties in aqueous solvents which is sensitive to pH, temperature, ionic strength, etc. For instance, the pH sensitive swelling behavior of Polyglycerylmethacrylate-carbon nanocomposite increases from acidic medium (SR~24, pH=3) to basic medium (SR~130, pH=12). The hydrogels also showed significant swelling behavior in presence of different biological samples such as folic acid, uric acid, DNA, RNA, etc. The electrical impedance value decreases to a large extent after the addition of carbon nanoparticles into the gels. It was observed that the conductivity rises to a maximum of about 1000 folds in the nanocomposite hydrogels. The increase in electrical conductivity is also verified by current-voltage measurements.

**Keywords:** Hydrosorbent; nanocomposites; swelling; conducting hydrogels; current-voltage study.

**S:** Supplementary information.

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