

Coordination Polymer Hydrogels Based on Coinage Metals and Nucleobase Derivatives

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Abstract : Hydrogels based on metal coordination polymers of nucleosides and a range of metal ions (Au, Ag, Cu) have been prepared and characterized by atomic force microscopy (AFM), transmission electron microscopy (TEM), X-ray photoelectron spectroscopy, Fourier transform infrared spectroscopy, ultraviolet-visible absorption spectroscopy, and powder X-ray diffraction. AFM images of the xerogels revealed the formation of extremely long polymer molecules (> 10 micrometers, the maximum scan range). This result is also consistent with TEM images which show a fibrous morphology. Oxidative doping of the Au-nucleoside fibres produces an electrically conductive nanowire. No sharp Bragg peaks were found at the at the X-ray diffraction pattern for metal ions hydrogels indicating that the samples were amorphous, but instead the data showed broad peaks in the range $20 < Q < 40$ and correspond to distances $d=2\pi/Q$. The data was analysed using a simplified Rietveld method by fitting a regression model to obtain the distance between atoms.

Keywords : hydrogel, metal ions, nanowire, nucleoside

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