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## Synthesis and characterization of magnetite nano-particles coated with modified nanocellulose for highly efficient sorption of radioactive ions in wastewater

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Magnetite nano-particles ($Fe_3O_4$) and modified nano-cellulose with citric acid, urea and acrylamide were prepared using chemical method. Samples of $Fe_3O_4$ coated with the modified nano-cellulose were characterized by Transmission Electron Microscopy (TEM), X-ray Diffraction (XRD), Fourier Transformed Infrared Spectroscopy (FTIR) and Vibration Sample Magnetometer (VSM). $Fe_3O_4$ with modified nano-cellulose was applied to adsorb many radioactive ions such as $Th^{232}$ daughters $Ac^{228}$, $Pb^{212}$, $Bi^{212}$ and $Tl^{208}$ radioisotopes from aqueous solution. The effect of contact time, PH and concentration of radioactive ions on adsorption process were investigated. High resolution gamma rays spectrometer of hyper pure germanium detector was used to measure the activity of radioactive ions before and after water treatment. The present work appeared that functionalized of nano-cellulose with $Fe_3O_4$ enhanced the adsorption process about $Fe_3O_4$ only. The prepared samples with modified nano-cellulose can be used at commercial level because low cost of production and no toxicity.

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## Electrochemical synthesis and properties of carrageenan-doped polypyrrole films

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Polypyrrole (PPy) is by far the most extensively studied conducting polymer, since the monomer pyrrole is easily oxidized, water-soluble, commercially available, as well as having good environmental stability, possessing redox properties and high electrical conductivity. Due to its good intrinsic properties, polypyrrole appears promising for use in batteries, super capacitors, biological sensors, conductive textiles and fabrics, microwave shielding, anti-static coating and drug delivery systems. Carrageenan is a generic name for a biopolymer family of water soluble, linear, sulphonated galactans extracted from red seaweed known for their gel forming and thickening properties. Two types of carrageenan were used in this study, ι-carrageenan and κ-carrageenan. The main difference between these polymers is the number of charged sulphonated groups per biopolymer repeat unit, i.e. one group for ι-carrageenan and two groups for κ-carrageenan. In this work, we report the synthesis of PPy films using electrochemical polymerization of pyrrole with the biopolymer carrageenan as dopant. The deposition of the films (onto ITO glass electrodes) was carried out by using galvanostatic techniques. Current densities of 0.7 mA were applied for 5 h in order to prepare thick polymer films under galvanostatic conditions. Circular dichroism spectroscopy showed that the carrageenan's optical activity was retained after it was combined with PPy. The conductivity of these films was evaluated using a four- point probe technique. Our results indicate that dialysis treatment of the carrageenan reduces the conductivity of the PPy-carrageenan films. The mechanical properties of our films were measured using a dynamic mechanical analyzer. The Young's modulus and tensile strength value of PPy-IC films were higher compared to those of the PPy-KC films. Contrary to conductivity, dialysis of the carrageenans resulted in increased Young's modulus and tensile strength. Scanning electron microscope images of the films show that PPy was covered by carrageenan. The thermal stability of our films was studied using thermogravimetric analysis. Films prepared without dialyzing the carrageenans results displayed an improved thermal stability compared to those prepared with dialysis.

### Biography

Ali Aldalbahi has completed his PhD from University of Wollongong, Australia on 2013. Also, he completed his master degree from University of Wollongong. He is the member of King Abdullah institute for Nanotechnology and School of chemistry at King Saud University Saudi Arabia. He has published 6 papers in reputed journals.

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