

European Chemistry Congress

June 16-18, 2016 Rome, Italy

Ion-imprinted thermoresponsive fluorescent hydrogel for removal and determination of uranyl ion

Elif Gökçe Atçakan and Orhan Güney
Istanbul Technical University, Turkey

Hydrogels are two or multi-component systems consisting of a three dimensional network of polymer chains with water filling the space between macromolecules and have sponge-like networks of cross-linked polymers with high porosity and large internal surface area. Stimuli-responsive or smart polymers are macromolecules that display a significant physiochemical change in response to small changes in their environment such as temperature, pH, light, magnetic field, ionic factors, etc. Molecular imprinting is a technique to synthesize cross-linked polymers with a predetermined selectivity and specificity for a given analyte. Ion-imprinted polymers are a kind of molecular recognition materials containing inorganic cation selective sites and prepared by using the molecular imprinting technology. Besides the stability and durability against hard chemical conditions, IIPs provide high sensitivity and lower detection limit due to the high adsorption capacities. In this work, a thermoresponsive ion-imprinted hydrogel was developed as an adsorbent and as a fluorescent sensor that can undergo phase transition both by the temperature and stimulation of ethanol-water mixture. Ion-imprinted fluorescent hydrogel was prepared in dioxane by free radical polymerization of N-isopropyl acrylamide as a main component, methacrylic acid as a functional monomer, 9-vinylcarbazole as a fluorescent monomer and N,N-methylenebis acrylamide as a crosslinker in the presence of uranyl ion. Swelling kinetic of thermoresponsive hydrogel was investigated in ethanol-water mixtures with different composition and upon temperature. The sensor behavior of fluorescent hydrogel for the determination of uranyl ion was evaluated both in swollen and shrunken state by monitoring of the fluorescence intensity of the carbazole moiety in hydrogel.

Biography

Elif Gökçe Atçakan received her BS degree in Chemical Engineering in 2014 from Istanbul Technical University, Istanbul, Turkey. She is a MS candidate at Polymer Science and Technology division of Chemistry department. Her research interests focus on the development of new imprinted polymeric materials for uranium detection.

atcakan@itu.edu.tr

Notes: