

5th World Congress on

GREEN CHEMISTRY AND GREEN ENGINEERING

July 19-20, 2018 Melbourne, Australia

Fabrication and characterization of biopolymer-based composite beads for effective removal of heavy metal ions from waste watersJibran Iqbal¹ and Anum Jamshaid²¹Zayed University, UAE²Kinnaird College for Women, Pakistan

Recently, attention has been drawn to the use of bio-reinforced composites in many fields due to increased concern for environmental sustainability. This study was conducted to assess the adsorption efficiency of polymer-based composite beads for removal of Cu and Ni from waste water. For this purpose, cellulose, sodium alginate and Hydroxy Apatite (HA) beads were synthesized. The materials used have environmental importance and are widely covered in green chemistry. A factorial design approach was conducted to establish the optimum conditions for the adsorption of heavy metals ions. The developed beads were characterized using Fourier Transform Infrared spectroscopy (FTIR), X-Ray powder Diffraction (XRD), Scanning Electron Microscopy (SEM) and Thermogravimetric Analysis (TGA). Presence of characteristic functional groups, surface morphology, thermal stability and percentage increase of cellulose was evidenced by these characterization tests. The effect of various experimental parameters on adsorption such as contact time, pH, initial metal concentration and adsorbent dose was studied during removal process. The adsorption process was fast with adsorption equilibrium achieved at 20 minutes for Cu and 30 minutes for Ni. It was found that the experimental data is best fitted with Langmuir isotherm model. The kinetic studies revealed that it follows pseudo second order kinetics. Increase in percentage cellulose caused increase in adsorption capacity. Maximum adsorption capacity for Cu and Ni was found to be 39.71 mg/g and 41.95 mg/g on beads with 60% cellulose.

Recent Publications

1. Khalid B, Rahim A, Muhammad N, Tabassum S and Iqbal J (2018) *In situ* immobilization of CuO on SiO₂/graphite matrix, modified with benzimidazolium-1-acetate ionic liquid: Application as catechol sensor. *Journal of Molecular Liquids*; 251: 450-457.
2. Iqbal J, Du Y, Howari F, Bataineh M and Muhammed N (2017) Simultaneous enrichment and on-line detection of low-concentration copper, cobalt and nickel ions in water by near-infrared diffuse reflectance spectroscopy combined with chemometrics. *Journal of AOAC International*; 100(2): 560-565.

Biography

Jibran Iqbal works as an associate professor at Zayed University. Jibran Iqbal's research is mainly focused on analytical chemistry and environmental chemistry. His recent and ongoing research has been primarily focused in the areas of low cost and sustainable water and wastewater treatment. The aim of his research is to develop state-of-the-art knowledge, tools and processes to advance the field of water purification and disinfection technologies to address the new challenges in the field of water treatment technologies through contributions to the areas of new materials/trace analysis method development.

Jibran.iqbal@zu.ac.ae