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Polymer materials with ability to remove pollutants from aquous medium

The need for water is increasing around the world. Oxyanions and metal ions pollution in water concern to worldwide due the toxic effect on humans. Currently, there are available several technologies and processes to remove these pollutants from aqueous sources, such resin nanonocomposites, differential precipitation, solvent extraction, distillation, ion exchange, and membranes. Membrane filtration easily allows this separation by means of the technique called liquid-phase polymer-based retention (LPR). Applications of water-soluble polymer materials (WSPMs) to the enrichment or separation of several metals and oxyanions from water have been reported. Through to washing or enrichment methods, Cr(VI), Mo(VI), V(V), and As(V) removal runs were carried out at different pH using WSPMs containing functional quaternary ammonium salts. The removal results showed highest retention capacity of these oxyanions depending on the pH. Moreover, polymer-clay nanocomposite materials present enhanced properties (mechanical, thermal, and barrier properties) compared with starting material (unloaded polymers). The use of polymer matrix with organic functional with capability to retain ion and filler such as clays lead to nanocomposite ion exchange resins. We have also studied polymer nanocomposite loaded with layered double hydroxide (LDH) as sorbents for oxyanions such as chromate and arsenate. Under different experimental conditions, the composite exhibited a high sorption reaching almost a 100% of removal. Also, the sorption of oxyanions presented a fast kinetics. By using these functional polymer materials it is also possible to remove organic pollutants as emergent antibiotics by LPR technique, varying the polymer structure and the removal conditions.

Biography

Bernabé L Rivas has completed his PhD at the University of Concepcion in 1980 and Postdoctoral studies at Tuebingen University, Germany with Humboldt Foundation Fellows in 1989-1991. He is Leader of the research group about Synthesis and Applications of Functional Polymers, Polyelectrolytes, Resins with Retention Properties for Pollutants Ions-Nanocomposites from Polypropylene and Biopolymers. He has published more than 420 papers in reputed journals, 29 chapter of books, h factor 35, and has been serving as an Editorial Board Member of Journals.

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