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Abstract

Synthesis and Characterization of Cellulose acetate titanium (IV) tungstomolybdate Nanocomposite Cation Exchanger for the Removal of Selected Heavy Metals from Aqueous Solution

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Abstract:

Cellulose acetate titanium (IV) tungstomolybdate nanocomposite cation exchanger was synthesized by sol-gel method by incorporating cellulose acetate polymer into inorganic exchanger, titanium (IV) tungstomolybdate. Different techniques including FTIR, XRD, TGA SEM and BET were used to characterize the exchanger. The Cellulose acetate titanium (IV) tungstomolybdate (CATTM) behaved as a good cation exchanger with ion exchange capacity of 1.64 meq g-1 for Na+ ions. The sequence of ion exchange capacity for alkali metal ions was found to be K+> Na+> Li+ and that for alkaline earth metal ions was Ba2+ > Ca2+ > Mg2+These orders revealed that the ions with smaller hydrated radii acquired larger ion exchange capacity. The pH titration curve indicated that the material obtained as such is a bi functional strong cation exchanger as indicated by a low pH (˜2.25) of the solution when no OH- ion was added. Thermal analysis of the material showed that the material retained 55 % of its ion exchange capacity up to 600°C. Adsorption behavior of metal ions in different solvents with varying concentration has also been explored and the sorption studies revealed that the material was selective for Cr(III) and Pb(II) ions. The analytical utility of the material was investigated by performing binary separations of selected metal ions in a column based on the distribution coefficients of the metals. Cr(III) and Pb(II) were selectively removed from synthetic mixtures of Cr(III)-Co(II), Cr(III)-Cd(II), Pb(II)-Co(II) and Pb(II)-Cd(II). Antimicrobial activity of the synthesized titanium (IV) tungstomolybdate compound was evaluated and showed a considerable

antibacterial activity against Staphylococcus aureus, Streptococcus agalactiae, Escherichia coli and Shigella flexneri. The inorganic counterpart has also exhibited a promising antifungal activity against Aspergillus niger and Fusarium oxysporum.

Biography:

Mr BELAY Minase Woldegebriel National Taiwan University of Science and Technology, Taiwan is Submitted his abstract on the conference on Frontiers in Nanotechnology and Nanomaterials; May 04-05, 2020; Vienna, Austria.

Recent Publications:

1. Mr BELAY Minase Woldegebriel et al; Synthesis and Characterization of Cellulose acetate titanium (IV) tungstomolybdate Nanocomposite Cation Exchanger for the Removal of Selected Heavy Metals from Aqueous Solution, 2019.

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