

15th International Conference on

Environmental Chemistry and Engineering

August 15-16, 2019 | Rome, Italy

The removal of Pb(II) by using amidoxime-modified polyacrylonitrile-grafted-cassava starch

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The presence of heavy metal ions in the environment is one of the serious threats for human health. Heavy metal pollutants have accumulating characteristics in nature, non-biodegradable with high toxicity even at trace concentrations. Pb(II) is associated with kidney and liver damage, anaemia, central nervous system problem and effects enzymes in living organism due to its high affinity towards ligands containing nitrogen and sulphur donors. Adsorption is regarded as a practical treatment method due to its low cost, high adsorption capacity, easy metal recovery and reusability. In the present work, we utilized our 'in-house' amidoxime-modified poly(acrylonitrile (AN)-grafted (g)-cassava starch (CS)) for the removal of Pb(II) from an aqueous solution. It was found that the maximum adsorption capacity of amidoxime-modified poly(AN-g-CS) was 63 mg.g⁻¹ at pH 4. The adsorption kinetic study showed that the optimum time required for the Pb(II) ions to attain saturation level was 2 h. The adsorption kinetic and equilibrium data were well fitted to the pseudo-second order model and the Langmuir isotherm model, respectively.