

**SYNTHESIS OF  
POLYANILINE/ CATECHOL/ ALGINATE BASED  
COMPOSITE BEADS FOR REMOVAL OF  
HEAVY METAL IONS**

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BASED COMPOSITE BEADS FOR REMOVAL OF HEAVY  
METAL IONS**

By

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## ABSTRACT

Lead ion ( $\text{Pb}^{2+}$ ) is known as one of the hazardous pollutants discharged from paint and batteries wastewater industries, which can contribute to toxic pollution, and have serious health effects. Adsorption is a widely used treatment technology because of its versatility and economic feasibility. Because raw Alginate beads have poor chemical stability and adsorption capabilities, the removal of  $\text{Pb}^{2+}$  was studied using PANI/ Catechol/ Alginate based composite beads at various weight percent of PANI. The FTIR analysis was carried out to identify the presence of organic, inorganic and polymeric components in the composite beads that serve as active sites for the adsorbent. It is suggested that carboxyl and hydroxyl were the major functional groups responsible for the removal of  $\text{Pb}^{2+}$ . According to the results, 6% PANI/ 2% Catechol/ Alginate based composite beads have the highest efficiency for the removal of  $\text{Pb}^{2+}$  with 88% removal. The Freundlich multilayer sorption capacity was observed to be 0.81 mg/g. This approach is applicable to both monolayer and multilayer adsorption, and the adsorbates are adsorbed on the adsorbent surface. The experimental data better fitted pseudo-first order than pseudo-second order. Thus, the study implied that PANI/ Catechol/ Alginate based composite beads could be an efficient adsorbent for the removal of  $\text{Pb}^{2+}$  from wastewater systems.