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# Synthesis and Characterization of nano γ-Alumina/β -Cyclodextrin as Adsorbent for Heavy Metal Adsorption

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Nano alumina is available in various forms, most of which are γ and α-$Al_2O_3$. The nano γ-$Al_2O_3$ is used often as an adsorbent than α form due to its higher porosity and called active alumina. In addition to the special properties of alumina, nano γ-$Al_2O_3$ has been more effective than other metal oxides as an adsorbent for toxic metals [1]. Nonetheless, the poor adsorption of toxic metals on to the nano γ-$Al_2O_3$, limits its use as a desirable adsorbent. The nano γ-$Al_2O_3$ was used as adsorbent to remove toxic metals such as cadmium, zinc, lead and copper.

Water insoluble β-cyclodextrin used as adsorbents for removal of organic pollutants and heavy metals in water due to their solubility in water (1.85g per 100ml) and high tendency to hydrogen bonding [2]. In a study, Pourshadlou et al [3] reported the uptake of magnesium from water by bentonite/γ-$Al_2O_3$ nano composite and the effects of various parameters including γ-$Al_2O_3$ content, initial ion concentration, and adsorbent dosage were investigated. Verma et al [4] synthesized β−cyclodextrin−ethylenediaminetetraacetic acid−chitosan (β−CD−EDTA−CS) polymer was synthesized for the removal of heavy metals and organic dyes from aqueous solution and investigated the effects of different parameters such as pH, time effect, initial concentration and reusability. They stated that absorption of heavy metals is faster than dyes.

In the current work, we synthesized nano γ-Alumina/β -Cyclodextrin as Adsorbent for Cd (II) Adsorption. The FT-IR, XRD SEM of nano γ-$Al_2O_3$ and γ-$Al_2O_3$/β-cyclodextrin composite were evaluated. The results showed good size and morphology for nano γ-$Al_2O_3$ and γ-$Al_2O_3$/β-cyclodextrin nanocomposite. So, the results indicated the efficiency of nano γ-$Al_2O_3$/β-cyclodextrin to remediate Cd(II) from aqueous solutions in our study [5].

***Keywords:*** Adsorption, Co-precipitation, Nano γ-Alumina/β –cyclodextrin, Toxic metals.

**References**

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