



## Preparation of $\gamma$ - $\text{Al}_2\text{O}_3$ from Industrial Waste Can and its use for the Adsorption of Metals: Cd(II) and Pb(II)

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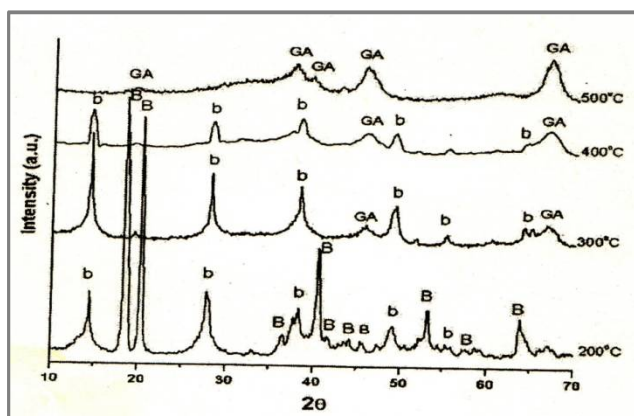
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### ABSTRACT

Aluminium oxide is an important chemical due to its many valuable properties such as hard ware resistance, good thermal conductivity, high strength and stiffness. Aluminium oxide is commonly referred to as alumina. In the present study, several types of alumina were synthesized from sodium aluminate ( $\text{NaAlO}_2$ ) by precipitation with sulfuric acid ( $\text{H}_2\text{SO}_4$ ) and subsequently calcinations at  $500^\circ\text{C}$  to obtain  $\gamma$ - $\text{Al}_2\text{O}_3$ . The various  $\gamma$ - $\text{Al}_2\text{O}_3$  synthesized were characterized by X-ray diffraction (XRD), adsorption-desorption of  $\text{N}_2$  ( $S_{\text{BET}}$ ). XRD revealed that distinct phases of  $\text{Al}_2\text{O}_3$  were formed during thermal treatment. Moreover, it was observed that conditions of synthesis (pH, aging time and temperature) strongly affect the physicochemical properties of the alumina. A high surface area alumina ( $370 \text{ m}^2 \text{ g}^{-1}$ ) was synthesized under mild conditions, from inexpensive raw materials. These alumina were tested for the adsorption of Cd (II) and Pb (II) from aqueous solution at toxic metal concentrations, and isotherms were determined

### Graphical Abstract



XRD patterns showing phases of alumina formed during calcination of (G7-75) (B:bayerite; b:boehmite; G:gibbsite; GA:  $\gamma$ - $\text{Al}_2\text{O}_3$ ).

**Keywords:** X-ray diffraction, Aluminum oxides, Mesoporosity, Adsorption.