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Protein Adsorption from Aqueous Solution by Supports

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Short Communication

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Abstract

Enzymes are the biocatalysts of the living world, but their properties render them also exploitable in many applications that range from industrial catalysis to therapeutics, including synthetic and pharmaceutical chemistry, wastewater bioremediation, fabrication of high performance biosensors, among others.

The use of enzymes, however, is limited by their recovery since this aspect plays a significant role in the evaluation of the cost of the biocatalytic processes, therefore several methods have been proposed for their immobilization on stable supports. This study investigates the possibility of using different phases of nano-alumina for enzyme capture and reuse.

Short Communication

Removal of pollutants from urban and industrial wastewaters is one of the main topics in modern research, and different methods have been proposed to efficiently and inexpensively solve the problem. Indeed, several chemical– physical methods, such as coagulation, flocculation, adsorption, electrochemical, and advanced oxidation processes (AOP), were studied and commonly applied to remove water pollutants [1-5].

Water pollution due to the disposal of industrial effluents enriched with toxic metallic species has drawn considerable attentions because of its harmful effects on fauna, flora and human being [6-8].

As human population increases, water supplies become more limited and water scarcity is a serious global issue [7].

Mesoporous materials with large, tunable porosity are currently being investigated as selective molecular sieves, finding potential applications in many fields such as catalysis, encapsulation of proteins, filtration and separation of large molecules, membrane technology, drug delivery, dosing, adsorption, sensing, among many others [8].

As one of the most important porous metal oxides, mesoporous gamma-Al2O3 has been widely applied in catalysis, catalysis support, adsorption and composite materials [9-11].

Alumina based adsorbents have several advantages, including stability, high surface area, possible reuse, short adsorption contact time and high mechanical properties. Therefore, it is very essential to develop simple and environment friendly methods to synthesize mesoporous gamma-Al2O3 with desired properties and novel morphologies [12].

Addition of metal oxides as adsorbents into the wastewaters has attracted a large amount of attention in water treatment processes due to their larger specific surface area and large number of active sites of adsorption [13].

The use of bio-based substances (BBS) obtained from composted bio waste as stabilizers for the production. The polymeric nature of these BBS suggests their

potential use as stabilizing agents for greener synthesis of nanoparticles [14].

In this work BBS was synthesized onto different phases of alumina nanoparticles in order to make biocatalysts to benefit them for water treatment applications.

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