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ENVIRONMENTAL FRIENDLY LOW COST ADSORBENTS FOR THE REMOVAL OF ORGANIC POLLUTANTS SUCH AS DYES FROM COLORED WASTE WATER

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Abstract

Today's entire world facing the severe water pollution due the excess use of different types of health hazard chemi... Among that, dyes are an important class of pollutants, and can even be identified by the human eye. Disposal of dyesin precious wa... resources must be avoided, however, and for that various treatment technologies are inuse. Among various methods, adsorpti... occupies a prominent place in dye removal. The growingdemand for efficient and low-cost treatment methods and the importance ... adsorption has given rise tolow-cost alternative adsorbents (LCAs).In addition, various other methods used for dye removal fro... water and wastewater arecompiled in brief. Various adsorbents have been used to remove different types of dyes and heavy metal io... from wastewater especially those that are harmful to mankind and aquatic animal and fauna. Activated carbons, plant or l... cellulosic wastes, clays and biopolymers are among the common adsorbents used. Organic dyes are considered as serious w... pollutants. There are several ways for removal of these compounds from environment, which are mainly based on biologi... chemical, and physical methods. In this chapter, we first classify the common organic dyes which are in use in today's industry; t... methods of their elimination from environmental water and wastewater are also discussed very briefly, with an emphasize o... adsorption techniques. At the end, some modern advanced adsorbents are presented.

Introduction

The presence of dyes in waterways is undesirable because it depletes the dissolved oxygen and reduces the sunli... penetration. In addition, dyes can escape from conventional wastewater treatment methods because they are generally designed... withstand physico-chemical and biological degradation [1-5]. The adsorption process is an attracting, simple and effective method ... remove pollutants from wastewater. Low-cost adsorbents are produced on the basis of low-cost materials or even wastes and so... economically attractive for practical application. Several materials such as agricultural wastes, natural compounds, and activa... carbon, have been used as adsorbents [6-10]. They tend to remove pollutants indiscriminately. However, further improvement of t... adsorption capacities, mechanical strength, and other properties are needed for a wider application. Polymeric adsorbents, due to t... vast surface area, perfect mechanical rigidity, adjustable surface chemistry and feasible regeneration under mild conditions, a... potential alternative to traditional adsorbents [11]. Polymeric adsorbents remove different pollutants from aqueous media. Adsor... capacity of a polymeric adsorbent toward pollutants can be improved using monomers which have functional groups such as a... group, due to the specific interaction of functional groups bound to the polymeric matrixes with the target pollutants.

Natural polymers are unique materials due to inexpensive, easily available, reproducible sources, hydrophilic and biopolymers, safe and devoid of side effects and flexible polymers. In addition, they have excellent adsorption specificat... remove pollutants including dyes from colored wastewater. Adsorption is a preferred method compared to other methods due to ... and comfortable and inscrutable to toxic contaminants. The natural polymers also have excellent properties such as low init... production of nontoxic by-products, relatively simple design and productivity in time. Properties of an ideal and suitable abso... removal dye include the following: extensive surface, high capacity and ability to absorb, the pores with appropriate size and ... comfortable accessible, efficient, economical, high mechanical stability, compatibility, easy regenerable, environmental ... high selectivity to elimination various dyes and needless of high processing techniques. Therefore, researchers have lately c... on expanding compounds based on natural polymers.

Some properties of dyes classified on their usage [12-13] are discussed in brief here.