

2017 年臺灣國際科學展覽會 優勝作品專輯

作品編號	200021
參展科別	環境工程科
作品名稱	Green Wastewater Treatment: Using Graphene Oxide produced from Date Pits to Degrade Organic Dyes via Novel Microwave Technique
得獎獎項	四等獎
國 家	Saudi Arabia
就讀學校	Abha Highe School-
作者姓名	Abdulaziz Yahya Alshahrani

作者照片



Abstract

Water treatment is considered as one of the top research priorities in Saudi Arabia. It has been reported by World Health Organization that, 50,000 people die every day from diseases caused by contaminated water. This research attempts to degrade organic pollutants present in wastewater by using Graphene Oxide synthesized from Saudi natural source. Physical activation of date pits was carried out by carbonizing the samples at different temperatures to produce active carbon. Hammer's method was employed for the purpose of Graphene Oxide production. The resulted Graphene Oxide has been characterized using FT-Raman, XRD and SEM techniques. Methylene Blue (MB) dye was used as a model organic pollutants to examine the ability of Graphene with the aid of a microwave-system to remove such pollutants. A modified domestic MS furnace with a variable power was used to supply microwave energy. The MB solution $2.5 \times 10^{-6} \text{M}$ was mixed with 0.1gm of Graphene Oxide. The applied microwave power was ranged between 100 to 700 W and the time was set between 0 to 12 minutes. The samples were centrifuged and then filtered through a millipore filter to remove the Graphene Oxide dispersed particles. It is found that, 98% of the initial concentration of MB is removed effectively within 12 minutes under microwave power of 500 W. Chemical oxygen demand is shifted from 450 to 87 mg/L while biological oxygen demand was decreased from 270 to 12.8 mg/L which indicating the degradation of organic constituents. This method can be used for water purification from organic pollutants.

【評語】 200021

This research presents experimental result of methylene blue (MB) degradation in water by using graphene oxide synthesized from Saudi natural source (data pits). Hammer's method was employed for the purpose of graphene oxide production. A modified microwave-system furnace with a variable power was used to supply microwave energy. It was found that 98% of the initial concentration of MB was removed effectively within 12 minutes under microwave power of 500W.