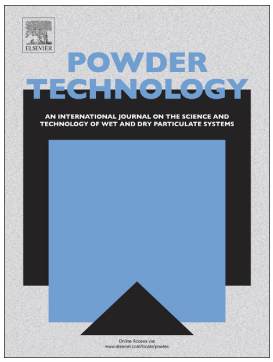

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PII: S0032-5910(18)30587-4
DOI: doi:10.1016/j.powtec.2018.07.089
Reference: PTEC 13571

To appear in: *Powder Technology*

Received date: 18 December 2017
Revised date: 14 July 2018
Accepted date: 24 July 2018

Please cite this article as: Xin Jiang, Hongying Xia, Libo Zhang, Jinhui Peng, Song Cheng, Jianhua Shu, Chunyang Li, Qi Zhang , Ultrasound and microwave-assisted synthesis of copper-activated carbon and application to organic dyes removal. Ptec (2018), doi:10.1016/j.powtec.2018.07.089

Ultrasound and microwave-assisted synthesis of copper-activated carbon and application to organic dyes removal

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Abstract: Organic dyes as toxic pollutants are difficult to treat, so an urgent challenge is to develop an efficient and economical adsorbent for dye wastewater treatment. In this work, ultrasound and microwave were used to synthesize copper-activated carbon (Cu-AC). The results indicated that Cu-AC exhibited much higher adsorption capacity than regenerated-activated carbon (R-AC) due to its large surface area and developed pore structure. The Cu-AC was employed as photocatalyst for degradation of methylene orange (MO) and cango red (CR) solution under UV light and visible light irradiation. The removal efficiency of CR solution was higher under UV light irradiation. The adsorption behaviors of Cu-AC and R-AC to MO were also investigated. The effects of different parameters such as pH, initial concentration and contact time on adsorption behaviors were performed in batch models. The results indicated that using Cu-AC to remove organic dyes was a cost-efficient way, which can realize the comprehensive utilization of waste resources.

Keywords: Spent activated carbon; ultrasound and microwave; photocatalytic activity; adsorption mechanism

1. Introduction

Different dye pollutants are produced in various industrial processes, such as textile, plastic, leather, food, dyeing [1, 2]. About 30% of the dyes may be lost during dyeing [3, 4]. The dye pollutants, especially toxic dyes may cause allergies, skin irritation in humans, which

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