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Authors: Hedong Zhang, Zuopeng Gao, Wenya Ao, Jing Li, Guangqing Liu, Jie Fu, Chunmei Ran, Xiao Mao, Qin hao Kang, Yang Liu, Jianjun Dai



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Microwave pyrolysis of textile dyeing sludge in a continuously operated auger reactor: Char characterization and analysis

Hedong Zhang, Zuopeng Gao, Wenya Ao, Jing Li*, Guangqing Liu, Jie Fu, Chunmei Ran, Xiao Mao, Qin hao Kang, Yang Liu, Jianjun Dai*
College of Chemical Engineering, Beijing University of Chemical Technology
15 Beisanhua East Road, Chaoyang District, Beijing, China 100029

*Corresponding author: Tel: 1-7789383886; e-mail: crystalldlj@gmail.com

*Corresponding author: Tel/Fax: 86-010-64452091; e-mail: daijianjun@hotmail.com,
jjdai@mail.buct.edu.cn

Highlights

1. SC yield decreased with microwave power. The content of C, H and N in SC decreased with temperature while S increased.
2. Both CaO and Fe increased the composition of H₂, CH₄ and CO, and decreased CO₂ content. CaO can absorb sulfur and CO₂.
3. Maximum BET surface area of 91.9m²/g was observed for SC at 550°C
4. DS volume was reduced to ~60-66% after MWP
5. Leaching tests proved that heavy metals in SC don't pose a threat to the environment

Abstract: Textile dyeing sludge (DS) contains toxic organic and inorganic substances, and needs to be disposed by appropriate technologies. This paper investigated an auger pyrolyser under microwave irradiation for treatment and disposal of DS. Microwave power, temperature, gas and solid residence times, addition of catalysts were studied. The results showed that the char yield gradually decreased with microwave power. The residence times of solid and gas have slight

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