

Effect of sonochemical treatment on thermal stability, elemental mercury (Hg⁰) removal and regenerable performance of magnetic tea biochar

Adnan Raza Altaf^{1*}, Haipeng Teng^{1*}, Liu Gang², Yusuf G. Adewuyi³, Maosheng Zheng¹

¹*School of Chemical Engineering Northwest University, Xi'an, 710069, China.*

²*State Key Laboratory of Clean Coal-based Energy, China Huaneng Group Clean Energy Research Institute Co., Ltd., Changping District, Beijing 102209, China*

³*Chemical, Biological and Bio Engineering Department, North Carolina Agricultural and Technical State University, Greensboro, North Carolina 27411, United States*

Author Information:

*Corresponding Author:

Adnan Raza Altaf – School of Chemical Engineering Northwest University, Xi'an, 710069, China; orcid.org/0000-0002-4723-2672; Email: adnan.raza.altaf@gmail.com; Contact: +8613259916079

Haipeng Teng – School of Chemical Engineering Northwest University, Xi'an, 710069, China; orcid.org/0000-0003-2987-7415; Email: tenghp@nwu.edu.cn; Contact: +86 13474024157

Sorbent Characterization: The sorbents' specific surface area and pores characteristics were determined by N₂ adsorption/desorption isotherm system at -196 °C (Quantachrome Nova 2000e, USA). The crystal structures on the sorbents were analyzed by X-ray diffractor-meter (XRD Philips APD 3720), and the position was 2°. The sorbents magnetic characteristics were determined by vibrating sample magnetometer (VSM), and the magnetic hysteresis curves were described at room temperature. The thermogravimetric analysis was investigated using thermogravimetric system (TG,Q500). The surface morphology of sorbent was analyzed by scanning electron microscope (SEM, JOEL 7100F). The valence state elements (C, O, Fe, and Hg) on sorbents were analyzed before and after the experiment by X-ray photoelectron spectroscopy (XPS, Shimadzu Corporation, Japan).