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**Regeneration performance and mechanism of modified walnut shell biochar  
catalyst for low temperature catalytic hydrolysis of organic sulfur**

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**Abstract:** In this study, four different regeneration methods (WR, NR, AR and WNAR), regeneration conditions and regeneration mechanism of a Fe-Cu-KOH supported on WSB as a precursor catalyst (Fe-Cu-KOH/WSB) for low temperature hydrolysis of CS<sub>2</sub> and COS were investigated. The results showed that the WNAR method (Water washing+Nitrogen sweeping+Alkali steeping regeneration) had the best regeneration performance. Under optimal regeneration conditions (500 °C nitrogen sweeping temperature and 13% KOH steeping content), the regenerated Fe-Cu-KOH/WSB catalyst could achieve to 42.64 mgS/g sulfur capacity, and it was close to fresh catalyst (48.58 mgS/g). A small amount of sulfate and a large number of -OH groups were washed away in water washing process. XPS, TG/DTA and DRIFTS results indicated that a large number of Fe<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub> were decomposed into

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