

## Regeneration of Deactivated Zeolites for Aromatization by Dielectric Barrier Discharge (DBD) Plasma

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In this work, spent zeolite catalysts were regenerated by removing coke using a dielectric barrier discharge (DBD) plasma. The DBD plasma generates microdischarge in the bed, resulting in the efficient removal of the coke. H-ZSM-5 and regenerated H-ZSM-5 was used to investigate the catalytic performance of acetylene non-oxidative aromatization. This reaction was conducted at atmospheric pressure and 923 K. The feed ratio was C<sub>2</sub>H<sub>2</sub>: H<sub>2</sub>: N<sub>2</sub>= 1: 2: 7 with gas hourly space velocity (GHSV) of 20,000 mL gcat<sup>-1</sup> h<sup>-1</sup>. The DBD plasma regeneration reaction was conducted at atmospheric pressure with aeration and near room temperature. The applied voltage to the reactor was 20 kV and the frequency was 1 kHz. Gas hourly space velocity (GHSV) was 1500 mL gcat<sup>-1</sup> h<sup>-1</sup> with feed of air. The amount of coke for fresh and spent H-ZSM-5 was analyzed by TGA, FT-IR, physisorption method. The data indicated that the DBD plasma discharge at ambient temperature significantly removed the coke of the spent H-ZSM-5 catalyst.