



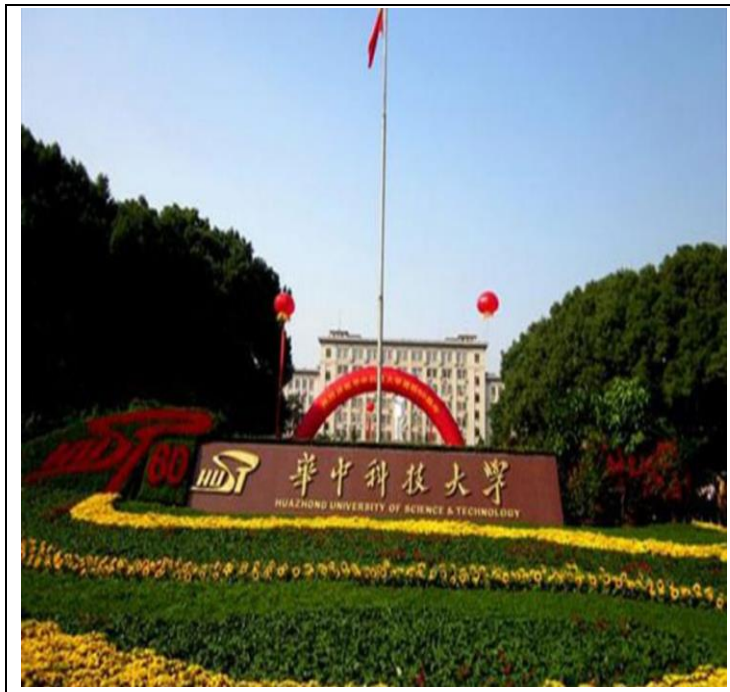
Research on N-doped carbon formation during biomass N-enriched pyrolysis

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Abstract: Biomass pyrolysis for high-valued products is an important development direction for biomass utilization. Biomass contains large amounts of O-containing groups. If using nitrogen to substitute oxygen, we may obtain abundant N-doped carbon materials contain lots of active N-containing groups, which can be applied in catalysis, adsorption, and energy storage. This research focused on formation mechanisms of N-doped carbon during introducing exogenous nitrogen, which is in favor of realizing efficient and valuable utilization of biomass wastes. The main works are shown as follows:

NH₃ was used as exogenous nitrogen to investigate the regulation evolution of N-containing species from bamboo wastes N-enriched pyrolysis at different temperature and NH₃ concentration. Formation mechanism of N-doped carbon was revealed. O-containing groups in char reacted with NH₃, NH₂* and NH*, and formed large quantities of N-containing groups through Maillard reactions. To improve the quality of N-doped carbon materials, KOH activator was introduced in N-enriched pyrolysis to investigate the synergistic effect of NH₃ and KOH on N-doped carbon materials. KOH reacted with active functional groups in biomass, and removed large amounts of O-containing groups to generate abundant active vacancies.



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Publications :

1. Wei Chen, et al (2018) Influence of biochar addition on nitrogen transformation during copyrolysis of algae and lignocellulosic biomass. Environmental Science & Technology, 52(16): 9514-9521.
2. Wei Chen, et al (2018) Catalytic deoxygenation co-pyrolysis of bamboo wastes and microalgae with biochar catalyst. Energy, 157: 472-482.
3. Wei Chen, et al (2018) Investigation on biomass nitrogen-enriched pyrolysis: Influence of temperature. Bioresource Technology, 249: 247-253.
4. Wei Chen, et al (2018) Influence of NH₃ concentration on biomass nitrogen-enriched pyrolysis. Bioresource Technology, 263: 350-357.
5. Wei Chen, et al (2017) Transformation of nitrogen and evolution of N-containing species during algae pyrolysis. Environmental Science & Technology, 51(11): 6570-6579.



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