Selective Phenol Recovery by Catalytic Cracking of Thermal Decomposition Gas from Epoxy-Based Carbon-Fiber-Reinforced

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Abstract:

To promote the recycling of carbon-fiber-reinforced plastic (CFRP), catalytic cracking of hazardous gases generated by thermal decomposition from epoxy-based CFRP composites was performed. We aimed for selective phenol recovery and hazardous gas removal using a zeolite catalyst. The BEA-type zeolite with Si/Al = 92.5 showed high conversion and low naphthalene selectivity. Thermal decomposition at 500 ºC produced bisphenol from the epoxy resin in the CFRP. Then, bisphenol was decomposed into phenol, cresol, and methylbenzofuran over the zeolite catalyst. However, naphthalene was formed under long contact time conditions. The temperature for catalytic cracking could be decreased to 350 ºC, which was lower than that for the CFRP thermal decomposition (around 500 ºC). Therefore, the process of selective phenol recovery and hazardous gas removal from CFRP thermal decomposition gas can be driven by the waste heat generated during CFRP thermal decomposition.

Frontier Labs Products used:

Multi-Shot Pyrolyzer (EGA/PY-3030D), UA5-30M-0.25F, Tandem micro-Reactor (Rx-3050TR), F-Search