

Surface Modification of Zeolite Adsorbent to Remove Harmful Gas Released from Rubber

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Harmful gases released from rubber composites of building materials are a cause of the indoor environmental problems such as sick house syndrome. In order to solve this problem, we analyzed harmful gases released from rubbers of three types (EPDM, NR, and SBR) used as building materials and investigated efficient adsorbents to remove it.

In order to analyze harmful gases released from rubber, rubbers were heated and released harmful gases were concentrated by liquid nitrogen because concentration of released harmful gases was very low and releasing rate was very slow. Harmful gases were analyzed by TD-GC-Mass and its compositions were mainly sulfur compounds, amine derivatives, and VOCs.

Zeolites of various types such as Zeolite 4A, Beta-zeolite, Mordenite, and ZSM-5 were modified by 1 N nitric acid at 70 oC for 12 h to enhance adsorbing ability of harmful gases. The efficiency of modified adsorbents was evaluated in the tedler bag with mixed harmful gas. H-ZSM-5 removed sulfur compounds, amine derivatives, and VOCs over 90% and showed good efficiency among the used adsorbents.