

The simultaneous removal properties of H<sub>2</sub>S and NH<sub>3</sub> on the Al-based catal-sorbents promoted with Ni and Mo in the hot coal gases

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To use simultaneous removal of H<sub>2</sub>S and NH<sub>3</sub> technology in IGCC process, it is necessary to remove hydrogen sulfide (H<sub>2</sub>S) by absorption and ammonia (NH<sub>3</sub>) by decomposition reaction from the hot coal-gases. In this study, the Al-based catal-sorbents promoted with Ni and Mo (MNAp20 and MNAl20) were prepared by physical mixing and impregnation method. The α-MNAl20 catal-sorbents were prepared by the impregnation of α-Al<sub>2</sub>O<sub>3</sub> (Aldrich) with Ni and Mo. Their simultaneous removal properties were tested in fixed-bed reactor during multiple removal reaction and regeneration cycles at high temperature conditions (removal reaction at 650°C and regeneration at 700°C). The H<sub>2</sub>S absorption and NH<sub>3</sub> decomposition breakthrough point time of MNAl20 catal-sorbent were 165 min and 155 min, respectively, and the simultaneous removal efficiency was about 94%, while those of the other catal-sorbents were below 55%. The simultaneous removal efficiency of MNAl20 catal-sorbent was excellent, which could be explained to the crystal structure effect and discussed by XRD, XPS and BET.