

## Decomposition of $\text{NH}_3$ over Zn-Al-based desulfurization sorbent promoted with various additives

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To investigate the simultaneous removal of  $\text{H}_2\text{S}$  and  $\text{NH}_3$ , Zn-Al-based sorbents promoted a transition metal such as with cobalt, nickel, and molybdenum additive were prepared by impregnation and co-precipitation method and the decomposition of  $\text{NH}_3$  was studied in a micro-reactor at 1 atm and  $650^\circ\text{C}$ . The  $\text{NH}_3$  did not affect the sulfur removing capacity of Zn-Al-based sorbent. The additive like cobalt, nickel and molybdenum, was found to be an active component in the  $\text{NH}_3$  decomposition as well as  $\text{H}_2\text{S}$  absorption, while the major components such as ZnO and  $\text{Al}_2\text{O}_3$  did not show any activity in the  $\text{NH}_3$  decomposition reaction. The  $\text{NH}_3$  was decomposed over both oxide and sulfide forms of the additives, even though the  $\text{NH}_3$  decomposition on the sulfide form of an additive dramatically decreased in the presence of excess  $\text{H}_2$ . In the case of oxide form, cobalt and molybdenum oxide showed an excellent  $\text{NH}_3$  decomposition capacity regardless of  $\text{H}_2$  concentration, while the capacity of nickel oxide depended on the  $\text{H}_2$  concentration.