The poisoning effect of K, Ca and Na on CeZrTiAl catalyst with nanosheet skeleton structure

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Abstract

The poisoning effect of KNO3, NaNO3, and Ca(NO3)2 on CeZrTiAl catalyst for selective catalytic reduction of NO with NH3 was investigated. It was found that the activity deactivation rate follows K> Na > Ca. SEM and BET showed that the accumulation of catalysts was severe after poisoning, and the nanosheet γ-Al2O3 skeleton structure disappeared due to alkali coating. The decrease of the specific surface area is accompanied by pore blockage, making the catalyst unable to expose rich reaction sites. In addition, the fewer surface Ce3+ and chemisorbed oxygen on the surface of the poisoned catalyst weaken the cycle between Ce3+ and Ce4+, resulting in bad redox performance. Thus, the failure to realize the efficient oxidation of NO to NO2. Another critical reason for catalyst poisoning failure is that the decrease of surface acid sites seriously affects the adsorption and activation of NH3 and NOx on the catalyst surface.

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