The selective catalytic reduction reaction and mechanism of citric acid modified the CeO2-WO3/TiO2 catalyst

Ming Cai[1], Xue Bian[1], Feng Xie[1], Yan Wang[1], Peng Cen[1], Wenyuan Wu[1], Guohua Xu[1], and Yuming Yang[1]

[1]Affiliation not available

June 15, 2022

Abstract

In this study, the CeO2-WO3/TiO2-n catalyst was synthesized by co-precipitation method with citric acid and the selective catalytic reduction (SCR) performance of citric acid modified CeO2-WO3/TiO2 catalyst was studied. The results demonstrated that compared with CeO2-WO3/TiO2 catalyst, CeO2-WO3/TiO2-6% catalyst has been widened about 30°C in the temperature range of 80% and 90%, respectively, and the highest denitration efficiency was 98.83% at 350°C. Additionally, citric acid formed complex with WO3 and CeO2 and three carboxylic acid groups can improve the stability of WO3 to inhibit the growth of TiO2 and CeO2 crystallites, thus promoting the dispersion of CeO2 and the formation of Ce-O-W solid solution. Furthermore, the strong interaction between CeO2 and WO3 in CeO2-WO3/TiO2-6% catalyst will release more Oα and Ce3+. Citric acid promoted the interaction of unsaturated W atoms and hydroxyl groups adsorbed on unsaturated W atoms, thus providing more Lewis and Brönsted acid sites on the catalyst surface

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