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Obalová, L.
2017

Dostupný z http://www.nusl.cz/ntk/nusl-369610

COBALT-CONTAINING MIXED OXIDE CATALYSTS FOR REMOVAL OF N_2O FROM NITRIC ACID PLANT TAIL GASES

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Key words: Nitrous oxide, Catalytic decomposition, Mixed oxides, Cobalt spinel

Catalytic decomposition of N_2O belongs to the Best Available Technologies for N_2O abatement from nitric acid production, which has been recognized as the biggest industrial source of N_2O emission. Many efforts have been made to develop the catalyst for efficient nitrous oxide removal from nitric acid tail gases at economically appealing low temperature (below 400 °C). However, this issue still remains an unsolved problem due to the presence of inhibiting co-reactants in the feed gas (O_2, H_2O and NO_x) and the low concentration of the N_2O pollutant.

Presented contribution summarizes our research dealing with cobalt mixed oxide catalysts for low temperature N_2O catalytic decomposition. Tuning of the catalyst properties was guided by catalytic tests of N_2O decomposition including the effect of water, oxygen and NO_x inhibitors, TPR-H_2 and in-situ work function measurements. The optimal composition of the catalyst revealed in the laboratory experiments was successfully reproduced in large scale synthesis and shaping. In the pilot plant tests (130 days), high output in N_2O removal from the tail gases of the nitric plant was reached.

Acknowledgement
This work was financially supported by the Technology Agency of the Czech Republic (project no. TA 01020336) and by the Ministry of Education, Youth and Sports of the Czech Republic in the "National Feasibility Program I", project LO1208 "Theoretical Aspects of Energetic Treatment of Waste and Environment Protection against Negative Impacts".