



národní  
úložiště  
šedé  
literatury

**Cobalt-Containing Mixed Oxide Catalysts for Removal of N<sub>2</sub>O from Nitric Acid Plant Tail Gases.**

Obalová, L.  
2017

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

Dílo je chráněno podle autorského zákona č. 121/2000 Sb.

Tento dokument byl stažen z Národního úložiště šedé literatury (NUŠL).

Datum stažení: 07.05.2024

Další dokumenty můžete najít prostřednictvím vyhledávacího rozhraní [nusl.cz](http://nusl.cz).

## COBALT-CONTAINING MIXED OXIDE CATALYSTS FOR REMOVAL OF N<sub>2</sub>O FROM NITRIC ACID PLANT TAIL GASES

Lucie Obalová<sup>1</sup>, Kateřina Pacultová<sup>1</sup>, Anna Klegová<sup>1</sup>, František Kovanda<sup>2</sup>, Květuše Jirátová<sup>3</sup>

<sup>1</sup>*VSB-Technical University of Ostrava, Institute of Environmental Technology 17. listopadu 15, 708 33 Ostrava, Czechia, Tel.: +420 597 321 532, E-mail: [lucie.obalova@vsb.cz](mailto:lucie.obalova@vsb.cz),*

<sup>3</sup>*University of Chemistry and Technology, Prague, Technická 5, 166 28 Prague 6, Czechia*

<sup>2</sup>*Institute of Chemical Process Fundamentals of the CAS, v.v.i., Rozvojová 135, 165 02 Prague 6, Czechia*

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

Catalytic decomposition of N<sub>2</sub>O belongs to the Best Available Technologies for N<sub>2</sub>O abatement from nitric acid production, which has been recognized as the biggest industrial source of N<sub>2</sub>O 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<sub>2</sub>, H<sub>2</sub>O and NO<sub>x</sub>) and the low concentration of the N<sub>2</sub>O pollutant.

Presented contribution summarizes our research dealing with cobalt mixed oxide catalysts for low temperature N<sub>2</sub>O catalytic decomposition. Tuning of the catalyst properties was guided by catalytic tests of N<sub>2</sub>O decomposition including the effect of water, oxygen and NO<sub>x</sub> inhibitors, TPR-H<sub>2</sub> 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<sub>2</sub>O 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".*