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## **Co-Mn-Al Spinel Catalyst for Removal of N<sub>2</sub>O from Nitric Acid Plant Tail Gases**

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## Co-Mn-Al SPINEL CATALYST FOR REMOVAL OF N<sub>2</sub>O FROM NITRIC ACID PLANT TAIL GASES

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The K-doped Co-Mn-Al mixed oxide deN<sub>2</sub>O catalyst was prepared by calcination of Co-Mn-Al layered double hydroxide, subsequent impregnation by KNO<sub>3</sub> and shaping into tablets 5x5 mm. Pilot plant catalytic measurement of N<sub>2</sub>O decomposition was performed in a fixed bed stainless steel reactor (0.31 m i.d.), temperature range from 300 to 450 °C and inlet pressure of 0.6 MPa. Reactor was connected at the bypassed tail gas from the nitric production plant downstream the SCR NO<sub>x</sub>/NH<sub>3</sub> catalyst. Feed to the reactor was varied between 300 and 600 kg h<sup>-1</sup> and contained typically 400-700 ppm N<sub>2</sub>O together with oxygen, water vapor and low concentration of NO, NO<sub>2</sub> and NH<sub>3</sub>. Various methods such as AAS, XRD, XPS, N<sub>2</sub> physisorption, He pycnometry, Hg porosimetry, and H<sub>2</sub>-TPR were used for characterization of the fresh and used catalysts. The changes in the surface composition, caused by the catalyst use for 112 days in the pilot reactor, did not negatively affect catalytic performance, average value of N<sub>2</sub>O conversion 90 ± 6% at 450 °C was kept (GHSV=8 620 m<sup>3</sup> m<sub>bed</sub><sup>-3</sup> h<sup>-1</sup>) (Fig. 1). Obtained kinetic data were applied in modeling of full-scale reactor for N<sub>2</sub>O emissions abatement.

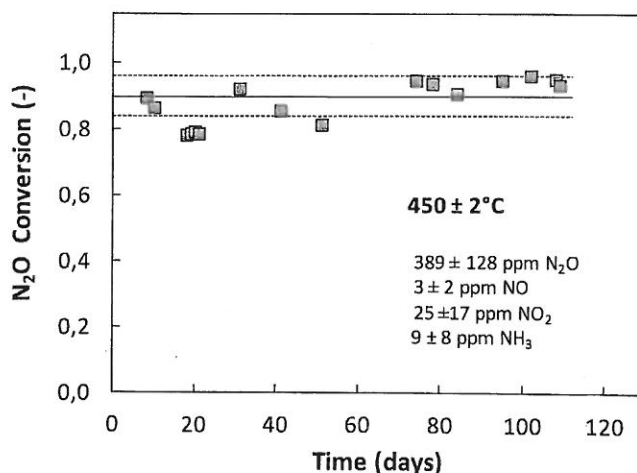


Fig. 1 Stability test over K/Co<sub>4</sub>MnAlO<sub>x</sub> catalyst in the pilot plant test (GHSV=8 620 m<sup>3</sup> m<sub>bed</sub><sup>-3</sup> h<sup>-1</sup>, p=0.6 MPa)