



národní  
úložiště  
šedé  
literatury

**Activity of K-Promoted Co-Mn-Al Mixed in Direct Decomposition of No and Deep Oxidation of Ethanol.**

Jiráťová, Květa  
2018

Dostupný z <http://www.nusl.cz/ntk/nusl-387720>

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

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

Datum stažení: 09.05.2024

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

## ACTIVITY OF K-PROMOTED Co-Mn-Al MIXED OXIDE IN DIRECT DECOMPOSITION OF NO AND DEEP OXIDATION OF ETHANOL

Květa Jirátová<sup>1</sup>, Jana Balabánová<sup>1</sup>, Kateřina Pacultová<sup>2</sup>, Kateřina Karásková<sup>2</sup>,  
Anna Klegová<sup>2</sup>, Lucie Obalová<sup>2</sup>

<sup>1</sup> Institute of Chemical Process Fundamentals of the CAS, v.v.i., Prague, Czech Republic  
<sup>2</sup> VŠB-TU of Ostrava, Institute of Environmental Technology, Ostrava, Czech Republic

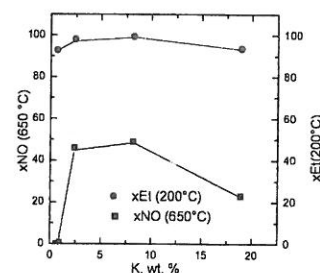
Co-Mn-Al mixed oxides are active in direct NO decomposition<sup>1</sup> as well as in deep oxidation of organic compounds<sup>2</sup>. In this study, Co-Mn-Al mixed oxides modified by K were prepared by co-precipitation of a solution of metal nitrates with the aqueous solution of K<sub>2</sub>CO<sub>3</sub> and KOH, washing the precipitates to different level of K concentrations and finally calcined at chosen temperature, usually 500 °C. The catalysts were characterized by AAS, nitrogen physisorption (*S*<sub>BET</sub>), TPR-H<sub>2</sub>, XRD, and TPD-CO<sub>2</sub>. In case of direct NO decomposition, the catalysts pre-calcined at 700 °C were tested for direct NO decomposition in inert gas (650 °C, 0.5 g, 1000 ppm NO/N<sub>2</sub>, 49 ml min<sup>-1</sup>). Deep oxidation of ethanol was carried out under following conditions: 0.2 g, 760 ppm of ethanol in air, 4 000 ml h<sup>-1</sup>, the temperature ramp of 2 °C min<sup>-1</sup>.

Chemical composition and physical-chemical properties of the prepared catalysts are shown in Table 1. Dependence of catalytic activity in NO decomposition and ethanol oxidation on K concentration is given in Fig. 1. Both reactions exhibit highest catalytic activity when Co-Mn-Al mixed oxides contain ca 8 wt. % of K. This catalyst shows the highest amount of basic sites desorbing during TPD in the range 25-500 °C.

Table 1 Composition of catalysts calcined at 500 °C, characteristics of their porous structure and positions of peak maxima in TPR curves

Sample	K	Co	Mn	Al	<i>S</i> <sub>BET</sub>	TPD-CO <sub>2</sub>	TPR	X <sub>NO</sub>	X <sub>Et200</sub>
	wt. %	wt. %	wt. %	wt. %	m <sup>2</sup> /g	mmol /g	<i>T</i> <sub>max</sub> , °C	650°C, %	%
1	18.90	28.2	6.0	3.0	<1	0.01	376	23	93.7
2	8.20	40.0	8.8	4.0	58	0.14	290; 614	49	99.5
3	2.39	45.4	10.2	4.7	110	0.13	362; 709	46	98.1
4	0.92	46.8	10.2	4.7	105	0.05	368; 726	0.6	ndtd
5	0.60	45.6	9.9	4.4	102	0.06	371; 756	0	92.9

Fig. 1 Dependence of NO and EtOH conversions on K concentration



**Acknowledgements:** We thank Czech Science Foundation (project No. 18-19519S) and the Ministry of Education, Youth and Sports of the Czech Republic (National Feasibility Program I, project LO1208 TEWEP and project No. LM2015039) for financial support.

### References

- <sup>1</sup> K. Pacultová, V. Drašíková, Ž. Chromčáková, T. Bílková, K. Mamulová Kutlárková, A. Kotarba, L. Obalová, J. Mol. Catal. A: Chemical, **2017**, 428, 33–40.
- <sup>2</sup> K. Jirátová, J. Mikulová, J. Klempa, T. Grygar, Z. Bastl, F. Kovanda, Appl. Catal. A **2009**, 361, 106–116.