Type of presentation: Poster

**MS-1-P-5798 Ozone decomposition over supported Ni/Pd catalysts synthesized by extractive-pyrolytic method**

**Batakliev T.**, Georgiev V.\(^1\), Serga V.\(^2\), Anachkov M.\(^1\), Rakovsky S.\(^1\)

\(^1\)Institute of Catalysis, Bulgarian Academy of Sciences, 1113 Sofia, Bulgaria, \(^2\)Riga Technical University, Institute of Inorganic Chemistry, 2169 Riga, Latvia

Email of the presenting author: todor@ic.bas.bg

1. Introduction – Ozone is widely used in the industrial and environmental processes such as semiconductor manufacturing, deodorization, disinfection and water treatment [1]. The residual ozone must be removed because on the ground level it is an air contaminant [2]. An effective method for purification of waste gases containing ozone is the heterogeneous catalytic decomposition [3]. A range of catalytic samples made by extractive-pyrolytic method and based on nickel and palladium nanoparticles supported on inorganic supports such as activated carbon, silica, alumina and aluminium oxide hydroxide have been tested in the reaction of ozone decomposition. Kinetic experiments of dry and humid ozone decomposition over alumina supported Ni/Pd catalytic samples were performed at O3/O2 flow rates between 6.0 and 24.1 h⁻¹. The properties of the catalysts were confirmed by using various characterization techniques as BET, XRD, SEM and TEM.

2. Experimental - The extractive-pyrolytic method (EPM) was used for catalysts preparation. This method allows small amounts noble metals with particle size ranging from several nanometers to several tens of nanometers to be affixed onto the surface of the support. The catalytic supports were loaded with 4.7 wt% nickel and 0.17 wt% palladium. The kinetic measurements were carried out in a glass tube reactor filled in with granulated catalyst. The inlet and outlet ozone concentrations were monitored using a BMT 964 UV absorption-type ozone analyzer.

3. Results and Discussion - The calculated conversions showed different catalytic activities of the samples in the reaction of ozone destruction. The experiments were carried out at ozone concentration between 10000 and 15000 ppm. The morphology and size of the palladium particles on the alumina support were studied by transmission electron microscopy.

4. Conclusions - It has been found out that all the treated Ni/Pd catalyst samples have some activities in the ozone decomposition reaction but the maximum conversion degree (up to 90%) is achieved using the carbon-supported Ni/Pd system. The TEM studies evidenced the influence of preparation method and pre-treatment conditions on the structural and catalytic properties of the samples.

References


Acknowledgement: The authors are grateful to ESF (Grant BG051PO001-3.3.06-0050) for financial support.
Fig. 1: TEM micrograph of the Ni/Pd catalyst supported on alumina