

# The Simulation of Flow and Reduction of NO in a Heterogeneous Reactor.

O. Śliczniuk<sup>1</sup>, B. Olejnik<sup>1</sup>

<sup>1</sup>Wrocław University of Technology, Faculty of Chemistry, Department of Chemical Engineering, Wrocław, Poland

## Abstract

Nitrogen oxides are one of the more dangerous ingredients contaminating the atmosphere. They are considered to be almost ten times more harmful than carbon monoxide, and sulfur dioxide several times. A whole range of photochemical reactions involving nitrogen oxides are responsible for the rise of the so-called smog and there are particularly dangerous to living organisms and to climate. NO is easily oxidized in air into nitrogen dioxide (within 30 sec. 92% of NO into NO<sub>2</sub> passes).

This study describes the method used in industry, reduction of nitrogen oxides using activated carbon bed. The reactor consists of a series of tubes packed in each one the reaction  $\text{NO} + \text{C} \rightarrow \text{CO} + 1/2 \text{N}_2$ . The reaction followed by purification of air through the NO reduction. To obtain the design results, you can use the interfaces ODE / PDE. The use of the CFD Module allowed to choose the optimal length of the reactor and to find the weak points of the model. To describe the reaction kinetics and diffusion models of non-stationary. The use of appropriately transformed model of unsteady allows to find the required weight of the catalyst. The values obtained from the ODE / PDE interfaces and the resulting simulations are consistent.