

## **New technologies and devices to solve environmental problems in the production of energy-materials**

© **Alexey F. Mahotkin,\* Vladimir I. Petrov,+ Rifkat A. Khalitov, and Igor A. Mahotkin**

*The Department "Equipment of Chemical Plants". Engineering Institute of Chemical Technology.*

*Kazan National Research Technological University. K. Marx St., 68. Kazan, 420015.*

*The Republic of Tatarstan. Russia. Phone: +7 (843) 231-40-98. E-mail: oxzkstu@rambler.ru.*

\*Supervising author; +Corresponding author

**Keywords:** exhaust gas cleaning, energy-saturated materials, swirling apparatus, catalysis.

### **Abstract**

This work presents the results of research and introduction into production of new vortex apparatus for intensification of mass transfer processes in the production of energy-materials. Presents a comparison of the effectiveness of vortical absorbers with known apparatus for the purification of exhaust gases from vapour and mist of nitric acid and nitrogen oxides. Developed and implemented catalytic purification of waste gases from nitrogen oxides. Developed and implemented a new vortex ferrosilicone column concentration of spent sulfuric acid that helps to reduce the consumption of materials technology 50 times compared with the known processes.