

UNIVERSITY OF BELGRADE  
TECHNICAL FACULTY IN BOR



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## TRACKING THE ABSORPTION ABILITY OF EXHAUST GASES MODEL MIXTURE USING AN AQUEOUS SOLUTIONS OF NaOH AND KOH

Students: Željka Nikolić, Adrijana Šutulović, Boris Rajčić, Dubravka Milovanović,  
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### Abstract

- **Introduction and objective**

Emission from vehicles is one of anthropogenic sources of air pollution [1]. Major pollutants emitted from fossil-fuel internal combustion engine are carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>), oxides of nitrogen (NO<sub>x</sub>), particulate matter (PM) and hydrocarbons (HC) including volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs) [2,3]. The aim of this probe was to examine the absorption ability of exhaust gases model mixture with an aqueous solutions of sodium hydroxide (NaOH) and potassium hydroxide (KOH).

- **Methodology**

Components of exhaust gases model mixture were CO, CO<sub>2</sub>, methane, ethene and ethane. Gaseous mixture was introduced in aqueous solutions of NaOH and KOH through glass diffuser [4,5]. During the introduction of gases turbidity occurrence and the change in alkalinity were monitored. Changes in gas concentrations by passing through the hydroxide solution were measured by separation technique Gas Chromatography (GC) with Thermal Conductivity Detector (TCD) and Flame Ionization Detector (FID).

- **Results**

During the introduction of gaseous mixture in aqueous solutions of NaOH and KOH turbidity and precipitation occur in proportion to the time. There was no measurable change in alkalinity of solutions in time for 160 min. The signal from CO<sub>2</sub> is descended below measurable value while signals from CO, CH<sub>4</sub>, C<sub>2</sub>H<sub>4</sub> and C<sub>2</sub>H<sub>6</sub> shown the same value prior to absorption.

- **Conclusions**

Difference in composition of exhaust gases model mixture indicates that an aqueous solutions of NaOH and KOH completely absorbs CO<sub>2</sub> until complete saturation. However, compounds CO, CH<sub>4</sub>, C<sub>2</sub>H<sub>4</sub> and C<sub>2</sub>H<sub>6</sub> were not absorbed at all with these solutions.

**Keywords:** Exhaust gases, Gaseous pollutants, Air quality, Environment protection, Fossil-fuels

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