



“Gheorghe Asachi” Technical University of Iasi, Romania



PtPd-CeO₂/γ-Al₂O₃ CATALYSTS FOR VOC TREATMENT OF EXHAUST GASES

Tatiana Yuzhakova^{1*}, József Kovács¹, Ákos Rédey¹, Rares Scurtu², Zsófia Kovács¹,
Viola Somogyi¹, Endre Domokos¹, István Ráduly³, Lenke Ráduly³

¹Institute of Environmental Engineering, University of Pannonia, 10 Egyetem St., Veszprém, 8200 Hungary

²“Ilie Murgulescu” Institute of Physical Chemistry, Romanian Academy, 202 Splaiul Independentei, 060021 Bucharest, Romania

³Faculty of Economics and Business Management, Babes-Bolyai University, Cluj-Napoca, 520036 Sfântu Gheorghe, Romania

Abstract

The study was focused on the catalytic elimination of hydrocarbons from the exhaust gases of car engines. Moreover the quantitative determination of the BTEX components (benzene, toluene, ethyl-benzene, m-, p-, o- xylenes) of the exhaust gases was carried out for untreated and treated model exhaust gases using gas mixture containing BTEX components in amount of 1 ppm. Aggregator without three-way catalyst was used for simulation of the exhaust gas mixture which is similar to that of Otto-type engines. PtPd-CeO₂/γ-Al₂O₃ catalyst was used for the treatment of exhaust gas in the catalytic test system. The catalyst was prepared by impregnation method. Active components of the catalytic system included ceria and noble metals (Pt, Pd <1 wt%). γ-Al₂O₃ was used as a support. Untreated and treated exhaust model gases were investigated by GC and GC-MS off-line analytical techniques. About 65 hydrocarbon components were identified in the untreated exhaust gas. Mainly olefins (e.g. ethylene, acetylene, propylene), iso-, normal paraffins (C₄-C₉) and cyclic hydrocarbons having one aromatic ring (e.g. benzene, propylbenzene) were detected. The primary results indicated that the catalytic conversion of hydrocarbons including BTEX was in the range of 23-100 %.

Key words: BTEX concentration, exhaust gas composition, GC-MS analysis, PtPd-CeO₂/γ-Al₂O₃ three-way catalyst

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* Author to whom all correspondence should be addressed: yuzhakova@almos.uni-pannon.hu; Phone: +36 88624403; Fax: +36 88624553