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STUDY OF THE NON-CATALYTIC AND CATALYTIC OXIDATIVE DESTRUCTION OF VOCs

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Abstract

In recent years, the release of volatile organic compounds (VOCs) has received much attention. Catalytic oxidation of VOCs, found in small concentration in industrial gas emissions constitutes an alternative for environmental pollution reduction.

In this paper, a comparative study regarding the non-catalytic and catalytic oxidative destruction of non-halogenated or halogenated C₆ hydrocarbons (C₆H₁₄, C₆H₁₂, C₆H₆, Cl-C₆H₅, Br-C₆H₅), is presented. Catalytic oxidation was studied in the presence of industrial V₂O₅-WO₃/TiO₂ (0.53 %wt. V₂O₅) catalyst, specific for SCR-DeNO_x processes in high-dust system. Oxidative destruction was carried-out at 150 – 350 °C in dry and, respective, humid air stream (5 %vol. H₂O), for low concentration of hydrocarbons in gas phase (< 100 ppm).

The catalytic oxidation of hydrocarbons is partial, apart of CO₂, also CO being detected at the end of the reaction. Study of non-catalytic oxidation of hydrocarbons showed that independent of the presence of water vapors, aromatic hydrocarbons do not react in gas phase. The acyclic hydrocarbons react in gas phase starting with the temperature of 300 °C.

Keywords: VOCs, C₆ hydrocarbons, oxidative destruction, V₂O₅-WO₃/TiO₂, SCR-DeNO_x catalyst

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