LETTERS
TO THE EDITOR

Formation of Dispersed Carbon in the Course of Chlorination with CCl₄ Vapor of γ-Al₂O₃ Surface

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The =Al–Cl surface groups of γ-Al₂O₃ are known as more reactive towards the nucleophilic agents (water, alcohols) than the =Al–OH groups [1, 2]. The common method of generation of Cl groups on the inorganic matrix surface (for instance, silica) is reaction (1) with CCl₄ vapor at 200–400°C in dry argon stream [3].

In the case of γ-Al₂O₃ at 200–500°C, the chlorination of the surface according to reaction (2) was accompanied by condensation of the dispersed carbon particles on the matrix surface. Depending on the treatment duration and the process temperature, the samples containing 0.3 to 3 wt % of carbon were prepared. The presence of carbon was confirmed by energy-dispersive X-Ray microanalysis; the elemental analysis data and the surface mapping revealed that carbon was quite evenly distributed at the pellet chip surface. The highest carbon condensation level was observed at 500°C.

Heterogeneous reactions were performed using the previously described gas phase installation [3], in the

dry argon stream (residual moisture content 0.5–1 mg H₂O/m³). The surface of γ-Al₂O₃ (70 m²/g, pores diameter 5.7 nm), was hydrated by boiling in distilled water. The content of OH groups was determined by differential thermal analysis using the DTA-500 device. The energy-dispersive X-Ray microanalysis was performed with Supra 40 VP X-ray emission microscope equipped with the INCA X-art attachment; Co was used as reference.

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