SOLID-PHASE MICROWAVE SYNTHESIS OF Ni–Co FERRITES AND THEIR INITIATION ACTIVITY IN LIQUID-PHASE OXIDATION OF p-XYLENE

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Abstract. This paper presents the results of microwave-stimulated solid-phase synthesis of double nickel-cobalt ferrites based on their oxides and natural magnetite concentrate as potential heterogeneous catalysts for the liquid-phase oxidation of alkylaromatic hydrocarbons. Using differential thermal analysis (DTA) and X-ray diffraction (XRD), it was established that the phase formation process, the formation of samples with a spinel structure ($Ni_{1-X}Co_XFe_2O_4$), in the oxidizing atmosphere begins significantly below the melting and decomposition temperatures of the initial oxides. Both the starting components and their solid-phase transformation products provided a sufficiently high level of microwave energy absorption. This allowed the required phase formation temperature to be reached within a few minutes of sample irradiation in the furnace resonator. It was shown that finely dispersed crystallites with a specific surface area of ~20-35 m^2/g are formed during microwave heat treatment of the samples at a radiation power of 600 W for a duration not exceeding 15 minutes. The high initiating activity of catalyst samples with $Ni_{0,6}Co_{0,4}$ Fe_2O_4 composition was established using the liquid-phase oxidation of p-xylene as an example.

Keywords: natural magnetite, solid-phase thermolysis, ferrospinel, electromagnetic radiation, liquid-phase oxidation.