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## SYNTHESIS OF HETEROGENEOUS CATALYSTS IN CHAIN PLASMACHEMICAL REACTIONS INTITATED IN BINARY MIXTURES Ni/Mo/Al<sub>2</sub>O<sub>3</sub>, Ni/W/Al<sub>2</sub>O<sub>3</sub> AND Ni/Co/Al<sub>2</sub>O<sub>3</sub> BY THE MICROWAVE RADIATION OF A POWERFUL GYROTRON \*'

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Synthesis of heterogeneous catalysts is considered that is achieved through depositing metal nanoparticles (nickel and molybdenum, nickel and tungsten, nickel and cobalt) onto a dielectric substrate from aluminum oxide. The new materials are produced in air at atmospheric pressure in chain plasmachemical reactions that are initiated during the irradiation of the powder mixture bye the microwave generation of a powerful pulsed gyrotron (frequency of 75 GHz, radiation power of 400 kW, pulse duration from 6 to 8 ms) [1, 2].

The particles are transferred to the surface of the substrate (see the figure below) in chain reactions in a complex system that consists of a hot gas, plasma, and dust grains. Such a system appears as a result of the initiation of microwave discharges in the metal-dielectric contact regions in the powder mixture [3].



(a) SEM images of a Ni/Mo/Al<sub>2</sub>O<sub>3</sub> sample after processing by the microwave radiation, scale of 100  $\mu$ m and b) enlarge image of a single particle of the same sample, on whose surface lighter deposited metal nanoparticles are seen, scale of 2  $\mu$ m.

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<sup>\*) &</sup>lt;u>abstracts of this report in Russian</u>