"Nanocomposites and nanomaterials"

Ostwald ripening of the platinum nanoparticles in the framework of the modified Lifshitz-Slezov-Wagner theory

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Nanotechnology (NT) is a cutting edge and highly promising interdisciplinary field with numerous potential applications including synthesis of new highly effective medicines, construction of super powerful computers, introduction of the 'molecular productions' working according to the principle 'from bottom to top', which ensures assembling of required nanostructures from separate atoms and molecules. Modern NTs are capable of constructing and utilizing the strategies similar to those working in nature.

Unique properties of the nanotubes ensure numerous potential applications in various electronic and light nanostructures such as diodes, field transistors, cold cathodes and displays.

An analysis of the experimental data related to the mechanism of Pt particles sintering [1] has been carried out using the modified LSW theory. The size distribution for the Pt nanoparticles at the stage of Ostwald ripening fits the generalized Lifshits-Slyozov-Wagner model calculated with the assumption of two parallel mechanisms involved in the nanoparticles growth (dissolution): diffusion and Wagner's (controlled by the chemical reaction rate) [2]. Comparison between the experimental histograms and the curves calculated theoretically proves the governing role of the Wagner's mechanism (chemical reaction) in the Pt nanoparticles growth.

1. *Mateo-Mateo C., C. Vazquez-Vazquez C., Perez-Lorenzo M., Salgueirino V., and Correa-Duarte M. A.* Ostwald Ripening of PlatinumNanoparticles Confined in a Carbon Nanotube/Silica-Templated Cylindrical Space // Journal of Nanomaterials. – 2012. –**2012**, Article ID 404159, 6 pages.
2. *Vengrenovich R. D., Ivanskii R. D., Moskalyuk A. V.* Generalized Lifshitz-Slyozov-Wagner distribution // JETP. –2007. –**131**, P. 1040-1047.