Nanocomposites and nanomaterials

Ostwald's ripening of single-layer carbon nanotubes under conditions of surface diffusion

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Due to intense developing nanotechnologies, a vast amount of the experimental data of the Ostwald ripening process has recently been obtained, and a lot of these data might not be adequately interpreted within the framework of the classical Lifshitz-Slyozov-Wagner (LSW) theory. It partially concerns the experimentally reconstructed diameter distribution functions of single-layer carbon nanotubes (SCNT) in the form of histograms, which correspond neither to the Chakraverty distribution nor to the Wagner's distribution. Meanwhile, these histograms are satisfactorily fitted by the generalized Chakraverty-Wagner distribution [1], computed in assumption of growth of NCs governed in parallel by two mechanisms, diffusion and Wagner's ones.

Kinetics of growth of SCNTs obtained in [2] was investigated in the research [3].

For description of experimentally obtained histograms corresponding to distribution of CNTs on relative diameters, theoretical Chakraverty-Wagner distribution has been attracted. However, coinciding or discrepancy of this distribution occurs to be dependent of the conditions of synthesis. Under complete suppression of catalyst (perfect deactivation), the stage of the OR is not start, and the Chakraverty-Wagner distribution does not fit experimentally obtained histograms. Depending on the level of catalyst deactivation, theoretical Chakraverty-Wagner distribution to a certain extent correlates with experimental data. For fully active catalyst, the Chakraverty-Wagner distribution occurs to be quite relevant for description of experimentally obtained histograms.

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2. *Tian Y., Jiang H., Pfaler J. V., Zhu Z., et al.* Analysis of the Size Distribution of Single-Walled Carbon Nanotubes Using Optical Absorption Spectroscopy // J Phys Chem Lett.-2010.-**1**, N 7.-P. 1143-1148.
3. *Vengrenovich R. D., Ivanskii B. V., Panko I. I., Kryvetskii V. I. Ostwald's* ripening of single-layer carbon nanotubes // Applied Optics.-2016.-**55**.-P. B4-B10.