To the Lifshitz-Slezov-Wagner Theory in Metal Alloys

Ivanskii B.V., StasykM.O.

Yuriy Fedkovych Chernivtsi National University, Chernivtsi, Ukraine

The Ostwald's ripening (OR) is the final stage of formation of a new phase as a result of phase transformation, such as decay of oversaturated solid solutions. Nanoclusters or nanocrystals (NC) of new phase having different sizes interact through the Gibbs-Thomson effect that results in dissolution of small NC and growth of large ones.

In work [1] the process of coarsening of nanoclusters or nanocrystals (NC) is investigated for the case when cluster growth (dissolution) is governed simultaneously by both diffusion along dislocation pipes and the rate of formation of chemical connections (chemical reaction) at cluster surface, *viz.* the Wagner's growing mechanism. For that, the total flow of atoms to (from) a cluster is represented by two parts, *viz.* diffusion part and Wagner (kinetic) one. The dependence of the rate of growth of NC on the ratio of the parts of the total flow has been determined as well as the NC's size distribution function referred to as the Wagner-Vengrenovich distribution.

Summarizing, it has been shown that the modified Lifshits-Slyozov-Wagner (*LSW*) theory [2] can be applied to nanocluster systems. Theory of the Ostwald's ripening for alloys containing nanocristalline phases must assume taking into account not only diffusion flow, j_d, but also kinetic (Wagner's) one, j_i, also. It has been shown, for alloys $Al-Sc$ [3] and $Al(Sc,Zr)$ [4] containing, correspondingly, NCs Al_3Sc and $Al_3(Sc_{1-x}Zr_x)$, that the size distribution function is satisfactory fitted by the introduced here Wagner-Vengrenovich (*WV*) distribution.

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3. Novotny G.M., Ardell A.J. Precipitation of Al_3Sc in binary $Al-Sc$ alloys // Material Science and Engineering A. – 2001. Vol.318. – P. 144-154.

4. Fuller Ch.B., Seidman D.N. Temporal evolution of the nanostructure of $Al(Sc,Zr)$ alloys: Part II-coarsening of $Al_3(Sc_{1-x}Zr_x)$ precipitates // Acta Materialia. – 2005. –Vol. 53. – P. 5415-5428.