NANOPARTICLES DYNAMICS ON A SURFACE: FRACTAL PATTERN FORMATION AND FRAGMENTATION

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The process of formation and post-growth relaxation of deposited structures is still not well understood [1-3]. The understanding of formation and post-growth relaxation processes would allow one to controllably influence the self-organization processes of particles on the surface and therefore to obtain patterns with predictable properties.

Here we present a detailed systematic theoretical analysis of the formation and the post-growth relaxation processes of nanofractals on surface. For this study we developed a method which describes the internal dynamics of particles in a fractal and accounts for their diffusion and detachment. We demonstrate that these kinetic processes control the final shape of the islands on surface after post-growth relaxation. We consider different scenarios of fractal relaxation and analyze the time evolution of the island's morphology. In Fig. 1 we illustrate several examples of such analysis. For details, see [2-3].

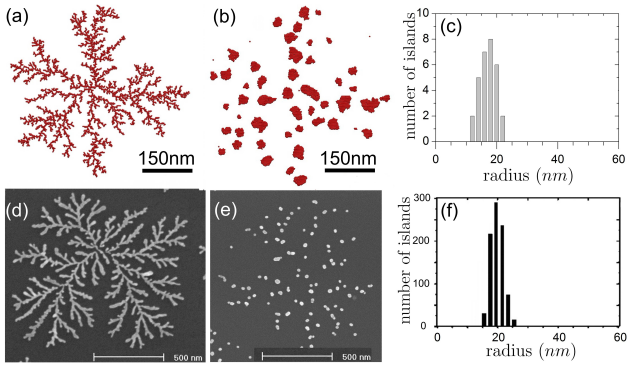

Fig. 1. Simulated evolution of fractal structure calculated in [2-3] (a)-(c) and experimental data for the silver fractal perturbation caused by oxidation of the silver clusters (d)-(f) [1].

We demonstrate that stability of the fractal structure depends strongly on several factors, such as the particles mobility and temperature [2-3].

References

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