Nanoobjects microscopy

Synthesis and properties of mono- and multilayer Ni films obtained by thermal deposition

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The formation mechanism of nanorelief of nickel at Si(111) during thermal evaporation in a vacuum was investigated. Several stages of nanorelief transformation during deposition were established (fig. 1.1). It was found that nanoassemblies have a similar to spherical shape and form clusters consisting of approximately 5-10 nickel nanoparticles. Obtained monolayer nickel structures can be described in the framework of electronic growth model.

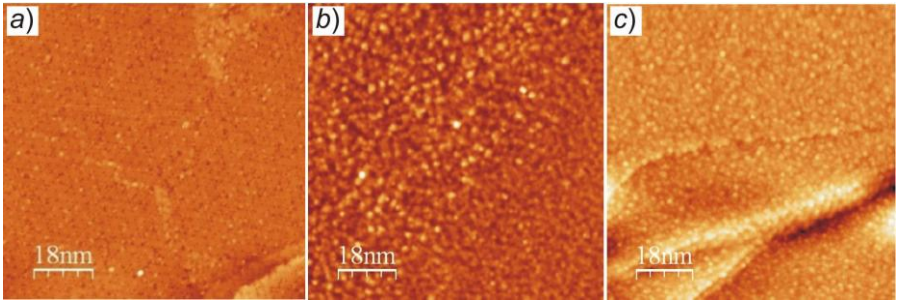

Fig. 1.1. STM images: a) 1 *s*, b) 3 *s*, c) 5 *s* deposition Ni on Si (111)

For studied surfaces the roughness parameters R_a, R_q, R_{zjis}, R_z, S_{ratio} were established, as their dependence on deposition parameters as well (1, 3, 5 seconds of deposition time, annealing temperarture). In contrast to 1 s deposition, when occurs a deposition of nickel submonolayer at Si(111) surface, for 3 *s* and 5 *s* it was shown an increase in the overall size of clusters maintaining the growth trends in the maximum difference between the cavities and protrusions.

Rather strong interaction of nickel monolayer with substrate was established. After surface annealing at considerable high temperature was observed the nickel desorption and the formation of a small amount of intermediate phase of $NiSi_2$.