

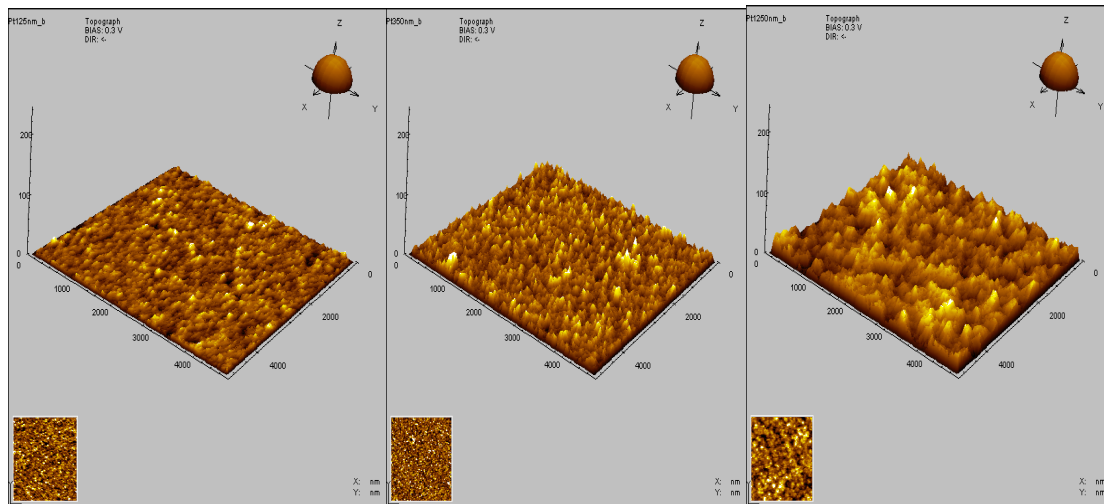
Anomalous Scaling In Surface Roughness Evaluation of Electrodeposited Pt Thin Films

G. Nabiyouni*

Department of Physics, University of Arak, Arak 38156, Iran

Abstract:

The effect of deposition time on the surface roughness evolution and the statistical properties of electrodeposited Ni, Cu and Pt thin films have been studied. The films were electrodeposited under galvanostatic control (fixed current densities). The deposition current density was kept constant at $0.5\text{mA}/\text{cm}^2$, while the deposition times (which are proportion to the film thicknesses) were varied between 125 and 1250 nm. In order to study and analyze the topography and surface roughness of the samples, we used atomic force microscopy technique. The roughness is defined as the root-mean square (rms) of surface width [1]. To study kinetic roughness we monitored this quantity as a function of film thicknesses. The figures shown below give the AFM images of a series of Pt films electrodeposited on sputtered Au(25nm)/Ti(3nm)/glass substrates. The images from left to right correspond to the films with thickness of 125, 500, and 1250nm respectively. The interface width of the films versus length scale is also calculated. Our results clearly show that the surface roughness increases as the film thickness increases in agreement with the works on different systems [2]. We found that the evolution surface roughness of our samples follows the anomalous kinetic scaling law. The effect of the electrodeposition current density (films growth rate) on the film surface roughness was also investigated. The results will be presented in the conference full paper.



References:

- [1]. W. Schwarzacher, *J. Phys. Condense. Matter* 16, R589-R880, (2004).
- [2]. A. Iwamoto, T. Yoshind and. H. Iwasoki, *Phys. Rev. Lett.*, Vol. 72, No. 25, 4025 (2001).

*email: g-nabiyouni@araku.ac.ir