12th International Conference on Surfaces, Coatings and Nanostructured Materials

11-13 September 2017

ABSTRACTS BOOK

Venue: Pierre & Marie Curie University, Paris, France

Editors: **Professor Jeff De Hosson** (*University of Groningen, Netherlands*); **Professor Abdelhafed TALEB** (*Pierre & Marie Curie University, France*)

NANO-264

The Role of Interstitial Clusters in Ion Beam Induced Bending

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Ion-induced bending phenomena were studied in free-standing nanosized Al cantilevers with thicknesses in the range of 89 to 200 nm. The objective is to present a predictive and useful model for the fabrication of micro- and nanosized specimens. Samples were irradiated in a Tescan Lyra dual beam system with 30 kV Ga^+ ions normal to the sample surface up to a maximum fluence of ~$2x10^{21}$ Ga ions/m^2. Irrespective of thickness, all samples bent initially away from the Ga^+ beam; as irradiation proceeded, the bending direction was reversed. The Al cantilever bending behavior is discussed in terms of depth dependent volume change due to implanted Ga atoms, radiation-induced point defects and interstitial clusters. A kinetic model is designed which is based on a set of rate equations for concentrations of vacancies, interstitial atoms, Ga atoms and clusters of interstitial atoms. The bending crossover is explained by the formation of sessile interstitial clusters in a zone beyond the Ga^+ penetration range. Model predictions agree with our experimental findings.

NANO-37(2)

Structure Transformations in Thin Films of CF_3-CFH_2 Cryodeposites. Is there a Glass Transition and What is the Value of T_g?

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In the course of our recent studies of the formation processes and properties of thin films of Freon 134a (CF_3-CFH_2) cryovacuum condensates, was observed [1], that in the temperature range from T=70 K to T=90 K, the sample undergoes a number of structural transformations. This is reflected both in the change of the absorption character and in absorption bands position of the IR spectra for practically all vibration modes of the CF_3-CFH_2 molecule. This paper is a continuation of these studies and aimed get answer to the question of whether we are observing a glass transition in solid Freon and what is the value of Tg in this case. For this purpose, measurements at different cryodeposition temperatures of samples in the vicinity of presumed glass transition temperature were taken. During the subsequent thermocycling at fixed observation frequency, thermograms from T=16 K to evaporation temperature T=102 K were measured. On the basis of obtained data and taking into account the results presented in [1], the assumption of presence of following structural transformations in Freon 134a cryofilms is made: the amorphous solid to amorphous glass transition at T=70 K; glass to supercooled liquid (SCL) transition approximately at Tg=79 K; crystallization of SCL into a plastic crystal in the range 81-83 K; the transition of plastic crystal to solid phase in the 85-88 K range.

[1]. A. Drobyshev and all. IR-studies of thermally stimulated structural phase transformations in cryovacuum deposited films of Freon 134a. Proceedings of 8th International Discussion Meeting on Relaxations in Complex Systems, Visla, Poland, Julay 23, 2017