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ABSTRACTS BOOK

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graphene-like films. The C-C bond energy in HOPG is 3.7 eV and it was recommended to start deposition below this energy- [1]. Here we reported on the deposition of amorphous carbon/ graphene-like films by application of PLD technology. The experiments were performed in a standard on-axis PLD configuration. The third harmonic of a Nd:YAG laser ($\lambda = 355$ nm, $\tau = 18$ ns FWHM, and a repetition rate of 10 Hz) was used for ablation of a microcrystalline graphite target. The substrate's temperature was 700 °C and vacuum at a pressure of 1×10^{-3} Pa was used in the deposition chamber. The substrates were (001) silicon (Si) covered by a 320 – 420 nm SiO₂. The deposition time was varied between experiments. The films have a thickness between 0.5 and 135 nm and are characterized by XRD, XPS, TEM, and Raman spectroscopic measurements. We established the formation of nanoscale defected graphene on top of a predominantly amorphous carbon films with 1 -3 nm thickness. Some initial results from conductivity measurements will be presented.

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CORRELATION BETWEEN SERS IMAGE VERSUS AFM IMAGE OF SILVER SURFACES OBTAINED BY THE ELECTROLESS TECHNIQUE

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This research has studied both the roughness of the glass used as a support for the film, as well as the roughness of the silver film deposited on palladium seeds sown by the Electroless technique [1]. The glasses used as film supports were treated with 100% nitric acid (HNO₃) and 2M potassium hydroxide (KOH). These treatments were used to reduce the concentrations of sodium and superficial carbon [2], as well as to increase the concomitant surface area of the glass [3]. The roughness measurements of the glass treated with HNO₃ did not show significant variation resulting in a mean square roughness (RMS) between 0.7 nm and 0.9 nm. Unlike glasses treated with KOH, which increased the RMS between 1.2 nm and 2 nm. The metal surfaces were obtained for 56mM silver deposits at exposure times 10, 15 and 20 minutes, evaluating the SERS response of each of the substrates with rhodamine B samples: 10⁻⁶ M. The results of correlating the Raman image with the AFM image gave the maximum SERS intensification of 12668 counts (ν : 1646.58 cm⁻¹) in a region with a roughness of 30 nm and a film thickness of 117 nm. Detection limits of 10⁻⁹ M for rhodamine B and 1 ppm for samples of arsenic pentoxide (ν : 820 cm⁻¹) were reached.

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NANO-107

Magnetic-field-induced synthesis of bimetallic wire-like nanostructures

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For ages, the magnetic field has been recognized as either an intrinsic material property or a parameter which describes the magnetic interactions between materials. Recently, it has been noticed that the magnetic field can be also treated as a reaction parameter, similar to conventional reaction conditions i.e. temperature, pressure, time, and chemical additives [1]. In general, this kind of processes are called as a magnetic-field-induced synthesis and are commonly applied in order to produce various magnetic wire-like nanostructures.

So far, most of the magnetic-field-induced process have been focused on the preparation of single metal nanowires like: iron nanowires [2], cobalt nanowires [3] or nickel nanowires [4]. Little attention has been paid on the manufacturing of bimetallic wire-like structures. In fact, this is caused by the synthesis of such materials is more complicated than the simple metallic structures. Nevertheless, this work presents a new concept of the magnetic-field-induced formation of bimetallic Fe-M nanowires (where M = Ni or Co). It describes their manufacturing procedures as well as their primary characterization results, including: morphological, structural properties and chemical composition.

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NANO-108(2)

Tuning the structure of ultrathin iron oxide islands on Ru(0001) by UHV annealing

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Ultrathin iron oxide (FeO) films grown on Pt(111) were shown to exhibit unique electronic [1], magnetic [1,2] and catalytic [3] properties not observed for bulk iron oxides. Special attention has also been paid to FeO islands which exhibit superior catalytic activity in CO oxidation reaction [4]. We studied ultrathin FeO islands epitaxially grown on another noble metal substrate – Ru(0001) – by room temperature iron deposition and post-oxidation in molecular oxygen. Scanning tunneling microscopy (STM), low energy electron microscopy (LEEM), local low energy electron diffraction (micro-LEED) and x-ray photoelectron spectroscopy (XPS) results revealed that such preparation procedure leads to the formation of well-dispersed and well-ordered FeO crystallites the size of which could be tuned by UHV annealing. Scanning tunneling spectroscopy (STS) dI/dV mapping experiments indicated the presence of potentially catalytically-active coordinatively unsaturated ferrous sites (CUFs) [4] at the perimeter of the FeO islands and within the UHV annealed islands, which makes FeO(111)/Ru(0001) an interesting material for model catalytic studies.

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