polymer surfaces resulted in the formation of nano- and micro-patterning. It has been demonstrated that tuning of physical and chemical properties is possible by EUV surface modification. Increased surface roughness up to many folds, controlled wettability (increased hydrophilicity or hydrophobicity as per requirements) and improved biocompatibility levels (improved cell attachment and cell adhesion) have been observed. Fig. 1 demonstrates improved cell attachment of L929 fibroblasts on EUV irradiated PTFE surface (b) as compared to pristine control sample (a).

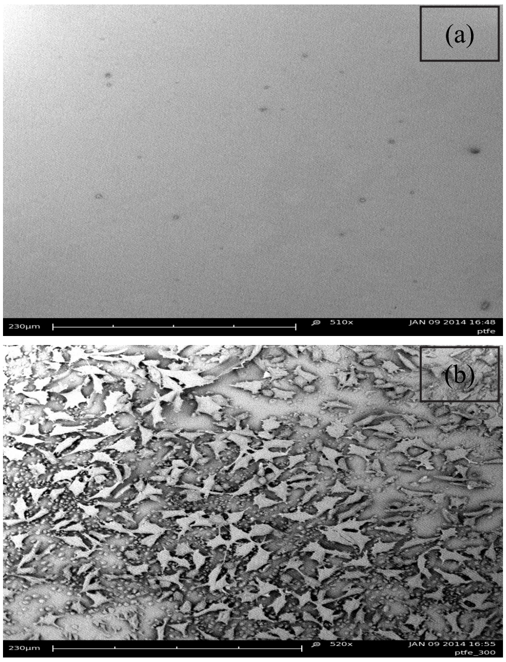

Fig. 1 SEM images of washed PTFE surfaces after incubated with L929 fibroblasts for 24 hours (a) pure sample, (b) irradiated with 300 EUV shots.

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X-Ray Absorption and Resonant Photoemission studies of Fe doped $SrTiO_3$ films for different parameters of PLD deposition

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The $SrTiO_3$ is an insulator with the energy gap of 3.2 eV, for which the nature of the resistive switching process was described in the filamentary model [1]. The STO thin film has promising properties of the resistive switching for future RRAM application [2]. Doping by acceptor and donor allow tuning of the electrical properties for this material. The doping is crucial for the electronic structure, especially in the energy gap. Last time the most of studies of Nb, Mn and Fe doping STO films were performed from the resistive switching process point of view [3-5]. In our work we focused on Fe doping and its contribution to the valence band. Three samples with different amount of defects were prepared by changing the PLD parameters, i.e. oxygen pressure and energy of laser. In order to describe the contribution of the Fe and main components to the electronic structure, the X-Ray Absorption Spectroscopy and Resonant Photoemission Studies were performed.

The epitaxial Fe doped STO films with thickness of about 20 nm were obtained by PLD (Pulsed Laser Deposition) method on the Nb doped $SrTiO_3$ single crystal substrate. Three samples 2% Fe doped $SrTiO_3$ were studied for three various parameters of PLD deposition. The samples were annealed in UHV conditions prior to study at 150ºC, 300 ºC and 630 ºC.

The Ti $L_{2,3}$, Fe $L_{2,3}$ and O K XAS spectra were obtained with used to of the two methods – total electron yield (TEY) measured by the drain current and Auger electron yield (AEY). The methods have different surface sensitivity.

The XAS spectra showed that Fe presents in the sample in two oxidation states 2+ and 3+. The relative content of these states is dependent on the deposition parameters.

The different parameters of the film deposition led to changes in the structure of the valence band, especially in partial density of states (PDOS) for broad Fe^{2+} structure and intensity of the top valence band Fe^{3+} components.

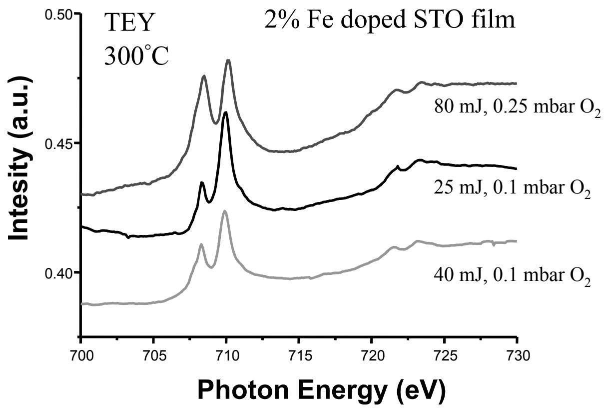

Figure 1. XAS spectra of the 2% Fe doped $SrTiO_3$ film obtained in TEY mode for various parameters deposition of the films after annealed at 300ºC.

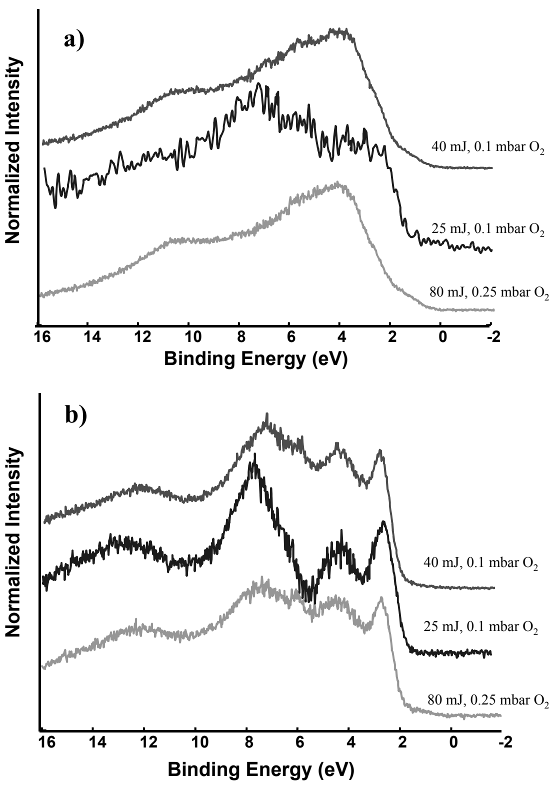

Figure 2. Partial density of Fe 3d states (PDOS) obtained as the difference between the valence band at: a) 708.3, b) 710 eV (on resonance) and 700 eV (off resonance), recorded from the various types 2% Fe doped $SrTiO_3$ films, annealed at 300ºC.

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