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## On the properties of organic heterostructures prepared with nano-patterned metallic electrode

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### Abstract

This paper presents a comparative study between the properties of the heterostructures realized with single / multi layer organic (zinc phthalocyanine or/and fullerene) prepared on Si substrate between flat or patterned aluminum (Al) layer metallic electrode and multi layer ZnO / Au / ZnO transparent conductor electrode (TCE). The UV-Nanoimprint Lithography was used for the realization of a 2D array of nanostructures (holes / pillars) characterized by a periodicity of 1.1  $\mu\text{m}$  and cylindrical shape: diameter = 400 nm and depth / height = 300 nm. The effect of the electrode patterning on the properties of the organic heterostructures was analyzed. For the samples with patterned Al electrode was remarked a slight red shift of the peaks in the reflection spectra determined by an increased interaction between the organic molecules in the delimited region of the patterned holes. The shape of the emission spectra at excitation with UV light showed a narrow intense peak around 500 nm associated with the intense resonance phenomena between the energy of the incident light and the surface plasmons in the patterned Al layer. The TCE followed the morphology of the organic film on which it was deposited. The significant differences between the morphology of the top layer in the heterostructures realized on flat and patterned Al are correlated with the total thickness of the

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