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Anisotropic Electrical Properties of Nanostructured Metallic Thin Films

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Abstract Submitted
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Anisotropic Electrical Properties of Nanostructured Metallic Thin Films MO AHOIJJA, Physics Department, University of Dayton, Dayton, OH, PIYUSH SHAH, University of Dayton Research Institute, Dayton, OH, ANDREW SARAGAN, University of Dayton Electro-optics, Dayton, OH, SAID ELHAMRI, Physics Department, University of Dayton, Dayton, OH, ELENA GULLIANTS, University of Dayton Research Institute, Dayton, OH — High surface area, porous, metallic (Ti, Cr) nanorod thin films with columnar microstructure can be deposited using conventional physical vapor deposition technique of E-beam evaporation. The technique relies on the physical vapor deposition onto a static substrate oriented in a position where flux from the source material (Ti, Cr) arrives at oblique angle. The adatoms provides geometrical shadowing which results in growth of nanorod columns in the direction of vapor source. Deposition conditions such as angle of the incoming vapor flux, substrate temperature, surface diffusion etc. have strong influence on the shape and arrangement of the columnar thin films. In this work, we demonstrate the growth and electrical characterization of these nanostructured thin films. Preliminary results on these films exhibit electrical resistivity anisotropy, when characterized by measuring their electrical resistivity using conventional van der pauw method. Origin and possible causes of this resistivity anisotropy is discussed.

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