ARTIFICIALLY DESIGNED MATERIALS USING METAL NANO-OBJETCS

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There is nowadays a strong interest for producing artificial structures by either patterning materials surface or producing materials having structural features in the nanometer (nm) scale with controlled dimensions or organization. The smaller features (i.e. dimensions below 10 nm) are still a challenge and in some cases difficult to achieve. This presentation will focus on artificial structures having nano-objects embedded in an oxide host and organised in layers in which nanometer features are typically < 10 nm. It will be shown that on the one hand, these artificially designed materials are promising for understanding fundamental interaction or energy transfer phenomena in the few nanometer scale. On the other hand, they can be designed in order to have properties tailored to specific applications. Examples include systems having layers whose separation is controlled down to < 1 nm, the layers being formed by either isolated or self-assembled elongated metal nano-objects all oriented perpendicular to the substrate, as well as their optical, acoustic or thermal properties.