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Plasma processing of metal-porphyrins and phthalocyanines for the fabrication of low dimensional metal nanostructured layers

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The development of new fabrication methods for the nanostructural control is crucial to synthesize rationally designed materials with enhanced properties.[1,2] Plasma activated deposition methods have evolved during the last decade from focus on compact thin films towards the controlled deposition of nanoscale materials.[3–4] Advantages of these vacuum-plasma methods mainly relay in their straightforward scalability, low deposition temperatures, compatibility with an ample variety of substrates and high accuracy in the composition, as well as on the control on their morphological characteristic as microstructure, texture or alignment.[3–4] However, a critical bottleneck for the application of procedures for the deposition of nanoscale materials is the limited availability of volatile metalorganic and metal halide precursors.

The present work stablishes the bases for a vacuum and plasma supported methodology for the fabrication of metal or metal-oxide nanostructured layers with controlled microstructure by using metal-porphyrins and phthalocyanines as precursors.[5-7] The layers synthesized range from compact to porous films as well as low dimensional nanostructures such as 2D networks, nanowires or nanocolumns, with a wide range of applications like optic, optoelectronic, catalysis or solar cells, among others.

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