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Effect of the substrate coating nanostructure on the carbon nanotubes growth

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Abstract – The control of the morphology of carbon nanotubes during the growth process continues to be a challenge. In this work we discuss the effects of the coatings used as diffusing barrier on the carbon nanotube growth.

To control the morphology of the carbon nanotubes (CNT) during the growth process continues to be a challenge. Hitherto, most of the reported studies are devoted to the microscopic control of the size distribution of the catalyst metal seeds and focusing the studies on the catalyze-nanotube interaction. Moreover, in order to prevent the catalyst metal diffusing, the substrates are normally coated with insulating films such as oxides or nitrides (TiN_x , TaN_x , SiO_x). Until now, however, the role of the coating (interface) is exclusively thought as a catalyst metal diffusion barrier, preventing metallic compound formation during the CNT growth process. In this presentation we shall show that the barrier also affects the CNT growth, i.e., the properties of the structure and composition of the material supporting the catalyst metal strongly influences the nanotubes growth. To illustrate these findings, the effect of the $TaNyOx$ structure on the CNT morphology is discussed.

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