

CATALYST SULPHUR ADDITIVES IN THE GROWTH OF CARBON NANOTUBES

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Scientific community have recently focused especial attention on carbon nanomaterials, specially on carbon nanotubes (CNTs), because of their fascinating physical properties and potential applications [1]. Some of these applications, such as gas and energy storage, require high yields of well-defined qualities, what makes Chemical Vapor Deposition (CVD) one of the most appropriate methods for the synthesis of carbon nanotubes as it is easily scalable and makes the synthesis economically available.

CVD is a versatile and promising method for CNTs synthesis as it offers the possibility of controlling a high yield synthesis of carbon nanotubes (CNTs) with specific properties by only controlling the different parameters taking place in the furnace during the hydrocarbon feedstock decomposition over a metal catalyst [2].

This communication explores the growth of CNTs by chemical vapor deposition (CVD) from methane decomposition over different catalysts prepared by the sol-gel technique, using MgO as support [3, 4] and varying the transition metal (active element in the catalyst). The aim of this work is to study the influence of additives, especially sulphur in different forms, on the activity of this kind of supported catalysts and how do the yield, morphology and physical properties of the obtained materials depend on their presence or lack in the catalysts. Both catalysts and carbon samples are characterized by electron microscopy (SEM and TEM), Raman spectroscopy, XRD, EDX, ICPS, TGA and adsorption isotherms.

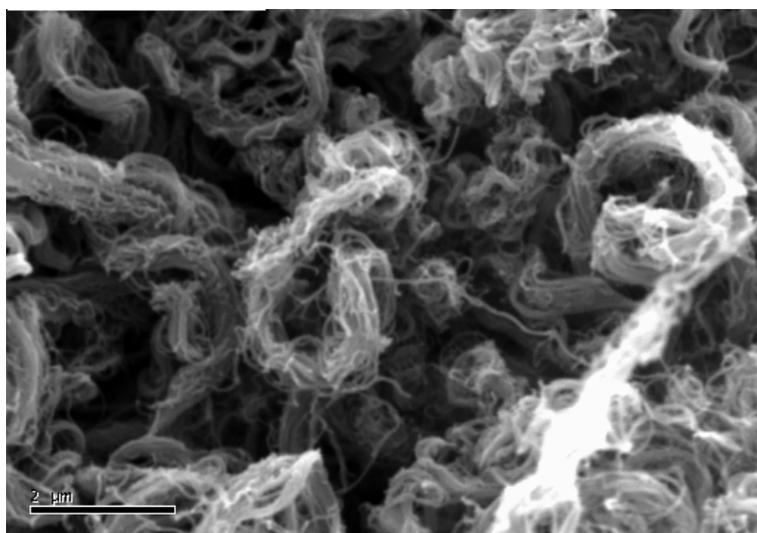
The scanning electron microscopy (SEM) reveals some of the most considerable changes introduced in the carbon nanotubes grown from a certain catalyst after the introduction of an additive. It can be observed important changes in the diameters and bundelling of the tubes (Fig.1a with no additive; Fig.1b with some sulphur as catalyst additive). The yield of the as-obtained material is also modified and helocoidal morphologies are introduced during the tubes growth by the only presence of traces of an additive in our sol-gel catalyst.

References:

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Figures:

1a



1b

