

ANUNCIO SEMINARIO

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Lugar: Instituto de Carboquímica ICB-CSIC
Salón de Actos

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Abstract

Inorganic nanotubes and fullerene-like nanoparticles at the crossroad between materials science and nanotechnology and their applications

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This presentation is aimed at demonstrating the progress with the high-temperature synthesis and characterization of new inorganic nanotubes (INT) and fullerene-like (IF) nanoparticles (NP) from 2-D layered compounds. Two important categories of new IF/INT nanostructures will be discussed in particular: 1. Synthesis of Doped IF/INT of WS₂ (MoS₂) by rhenium and niobium; 2. Synthesis of IF and in particular INT from the ternary misfit compounds, like PbS-TaS₂, CaCoO-CoO₂ and numerous others. [1] The synthesis of 1-D nanostructures (nanotubes) from this vast group of layered materials is particularly promising.

Major progress has been achieved in elucidating the structure of INT and IF using advanced microscopy techniques, like aberration corrected TEM and electron tomography. Recent optical, electrical and mechanical measurements of WS₂ nanotubes will be discussed. Re-doped IF-MoS₂ NP exhibit superior solid lubrication behavior in different environments and can find numerous applications in e.g. medical technology, which will be briefly demonstrated. [2] Applications of the IF/INT as superior solid lubricants and for reinforcement of polymer, as well as other nanocomposites, which gained a lot of momentum in recent times, will be briefly discussed. Few recent studies indicate that this brand of nanoparticles is non-toxic and biocompatible. With expanding product lines, manufacturing and sales, this generation of superior lubricants is becoming gradually an industrial commodity.

References

1. L.S. Panchakarla et al., *J. Phys. Chem. Lett.* **5**, 3724 (2014)
2. A. Sedova et al., *Nanomater. & Energy*, **4**, 30 (2014)