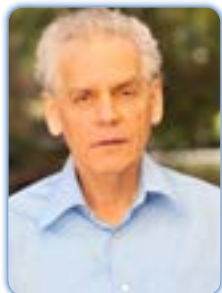


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Inorganic nano-tubes and fullerene-like nano-particles at the cross road between materials science and nanotechnology and their applications

This presentation is aimed at demonstrating the progress with the high-temperature synthesis and characterization of new inorganic nano-tubes (INT) and fullerene-like (IF) nano-particles (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, GdS-CrS₂ and many others. The synthesis of 1-D nanostructures (nano-tubes) 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 with WS₂ nano-tubes will be briefly 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. Applications of the IF/INT as superior solid lubricants and for reinforcement of polymer, as well as other nano-composites, which gained a lot of momentum in recent times, will be briefly discussed. Few recent studies indicate that this brand of nano-particles is non-toxic and biocompatible. With expanding product lines, manufacturing and sales, this generation of superior lubricants is becoming gradually a commodity.

Biography

Reshef Tenne was the Head of the Department of Materials and Interfaces of the Weizmann Institute and the Director of the Gerhard M.J. Schmidt Minerva Center for Supramolecular Architecture (2001-2007), the Director of the Helen and Martin Kimmel Center for Nanoscale Science and holds the Drake Family Chair of Nanotechnology. He became Fellow of the World Technology Network in 2003 and was awarded the Kolthoff Prize of Chemistry of the Technion (2005); the Materials Research Society (MRS) Medal (2005); the Rafael Prize for Excellence in Science of the Israel Vacuum Society (2005); the Landau Prize for nanotechnology by the Israeli Lottery (2006). He was elected as MRS class of (inaugural) Fellows (2008); received the Israel Chemical Society Excellence Award (2008) and the European Research Council Advanced Research Grant (2008). He became a Fellow of the Royal Society of Chemistry, was elected to the Israel Academy of Sciences and Academia Europaea in 2011 and received the CNR Rao Prize of the Indian Chemical Research society in 2012 and the Chinese Academy of Sciences-Plenary Speaker award of NanoChina 2011. He has published some 290 original papers and about 40 invited chapters in books and review articles. He delivered more than 220 invited, keynote and plenary talks in international and national conferences and meetings.

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