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Inorganic fullerene-like nanoparticles and nanotubes, overview and recent results

The latest developments and the main achievements in the field of inorganic fullerene-like (IF) nanoparticles and nanotubes (INT), which were discovered by the Tenne group of the Weizmann Institute of Science in 1992, will be shortly presented. We consider some aspects of synthesis, structure and properties of the closed-cage nanoparticles that were studied over the about three decades using different modern experimental techniques (HRTEM, SEM, XRD, etc.) as well as advanced theoretical approaches. Elucidating the growth mechanisms of different kinds of the nanoparticles allowed us achieving substantial progress in the synthesis of INT and IF nanoparticles of WS2 and MoS2 including pure and doped, e.g. by Nb atoms, and many other layered compounds. Rising interest to this kind of materials has been accomplished in the use of such nanoparticles for tribological applications and lately for impact resilient nanocomposites. The tests indicated that IF-MoS2 and IF-WS2 are heading for large-scale applications in the automotive, machining, aerospace, electronics, defense, medical and numerous other kinds of industries. In view of their eminent applications potential, much effort and substantial progress has been achieved in the scaling-up of the synthesis of inorganic nanotubes and fullerene-like nanoparticles of WS2 and MoS2 and also other compounds. A few products based on these nanoparticles have been commercialized by "ApNano Materials, Inc.

Biography

Yishay Feldman has completed his PhD from Weizmann Institute of Science and also completed his Post-doctoral studies from National Renewable Energy Laborotory, USA. He is currently working as the Head of X-ray Diffraction Laboratory at the Weizmann Institute of Science. He has published more than 115 papers in reputed journals, a chapter in a book, and has several patent applications.

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