PTH 22 **NanoCogs: Vanadium Oxide Nanostructures with Six-Fold Rotational Symmetry**

C. O'Dwyer[1], V. Lavayen[2], S. Newcomb[3], E. Benavente[4], M. Santa Ana[2], G. González[2], C. Sotomayor Torres[1]
[1]Tyndall National Institute, University College Cork, Cork, Ireland [2]Department of Chemistry, Faculty of Science, Universidad de Chile, Santiago, Chile [3]Glebe Scientific Ltd., Newport, Co. Tipperary, Ireland [4]Department of Chemistry, Universidad Tecnológica Metropolitana, Santiago, Chile

Although there are numerous reports describing a wide range of V_2O_5-based nanostructures, the majority or reports focus on low-dimensional systems such as tubes, ribbons, blades, belts and wires.In this work we report the first observation of unique hierarchical six-fold rotational symmetrical vanadium oxide based nanocomposite synthesized by a simple chemical route. Each cog-like structure is composed of six spoke-like platelets of equal dimensions and crystal orientation. Given the high surface area, their application as charge storage materials is promising since Li incorporation into vanadate is well understood and controllable. Their unique structure allows also for cog-like resistive-type gas sensoring applications by addition of SnO_2 as a dopant. The form adopted plays a major role in determining the basic properties, for example, isotropic or anisotropic behaviour and region-dependent surface reactivity. The overall structure has six-fold rotational symmetry and the synthesis results in the unique observation of this one characteristic and uniform structure, even in quantities of the order of grams and they have potential application for Li-based charge storage devices.

PTH 23 **Excitonic transition energies in single-walled carbon nanotubes: Dependence on environmental dielectric constant**

Yutaka Ohno[1], Shinya Iwasaki[2], Yoichi Murakami[3], Shigeru Kishimoto[2], Shigeo Maruyama[4], Takashi Mizutani[5]
[1]Dept. of Quantum Eng., Nagoya Univ. and PRESTO/JST [2]Dept. of Quantum Eng., Nagoya Univ. [3]Dept. Mechanical Eng., Univ. of Tokyo [4]Dept. of Mechanical Eng., Univ. of Tokyo [5]Dept. of Quantum Eng. and Inst. of Adv. Res., Nagoya Univ.

Optical transition energies in SWNTs are affected by environmental dielectric constant (ϵ) because the electric field regarding carrier-carrier interactions spreads outside the SWNTs. In this work, we have investigated the environmental ϵ dependence of excitonic transition energies in the range of ϵ from 1.0 to 37.5 by soaking SWNTs suspended on gratings in various liquids.
The SWNTs were grown on a grated quartz substrate by alcohol CVD. Both period and depth of the grating were 2 μm. The density of SWNTs was less than 1 μm^{-1} along a groove. PL and PLE maps were measured using a CW Ti/Sapphire laser, a 25-cm monochromator, and a L-N_2-cooled InGaAs PMT. The sample was mounted in a vessel with a quartz window, and soaked in various solvent.
The excitonic transition energies showed a clear ϵ dependence; a redshift with increasing ϵ, which can be expressed by a simple empirical form as $E = A\epsilon^{-\alpha} + E_0$. The redshift can be explained by dielectric screening of e-e repulsion interaction.

PTH 24 **ELECTRONIC STRUCTURE OF ARTIFICIAL AND COSMIC NANODIAMONDS**

Alexander Okotrub[1], Lyubov Bulusheva[1], Irina Larionova[2], Vladimir Kuznetsov[3]
[1]Nikolaev Institute of Inorganic Chemistry SB RAS [2]Federal Research & Production Centre Altay [3]Boreskov Institute of Catalysis SB RAS

X-ray absorption and X-ray photoelectron spectroscopy has been used for comparative study of the electronic state of carbon constituted the detonation nanodiamonds (ND) and that occurred in various carbonaceous chondrite meteorites. The fractions of the detonation ND purified using different oxidative treatments were studied. The treatment of detonation soot with a mixture of nitric and sulfuric acids followed by ion exchange and ultrafiltration of hydrosol obtained was found to result in developing of ND surface coverage consisting of a few graphitic-like layers and oxidized carbon species, which electronic state is close to that of strongly oxidized graphite. The deeper purification of ND was demonstrated to allow cleaning of ND particles from the graphitic-like component and the most of oxidized carbon contaminations. Carbon exiting in the meteorites studied (Staroe Boriskovo, Isna, Murray, Murchison, Orgueil, Allende, Kainsaz, and Mighei) is mainly presented by diamond and graphitic-like species; the latter component could be developed in the result of meteorites irradiation.