



The Hebrew University Center
for Nanoscience & Nanotechnology



Nano Seminar

Colloidal chalcogenide nanoplatelets, a 2D material beyond graphene, and different from TMC.

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Abstract:

Two-dimensional (2D) semiconductor crystals with a thickness much smaller than their lateral dimensions are one of the key elements of modern microelectronic and optoelectronic. Recently, ultrathin semiconductor layers have been obtained or synthesized in a free-standing form, so that the ultrathin layers can be manipulated without their substrate¹. We will present the synthesis of colloidal atomically flat, fluorescent chalcogenide nanoplatelets with a thickness that is controlled between 2 and 7 monolayers with atomic precision². These nano-platelets can be extended laterally into nano-sheets up to the micron-scale³. As their spherical counter parts, the quantum dots, they can be grown into 2D core/shell structures which are the first demonstration of colloidal multiple quantum wells⁴. We will discuss the physical properties and the spectroscopy of this novel generation of 2D system that have quantum yield that can reach 80% at room temperature⁵, and radiative fluorescence lifetime as short as 300ps⁶. The auger recombination in these structures will be discussed and compared to the non-blinking core-thick shell spherical QDs we have recently synthesized and characterized⁷, or to the golden QDs (fluorescent/plasmonic hybrid structures)⁸. We will present the first example of core/crown CdSe/CdS core/crown structures⁹. In the last part of the talk, we will show that these nano-platelets can be used for various applications ranging from light emitting diodes¹⁰ to photo-detectors¹¹.

Gathering & Refreshments at 9:50

Please contact Liron Dover at 6584919 if you are interested in meeting the lecturer.

Wednesday, Oct 14th 2015, 10:00 at the Seminar Hall
Los Angeles Building, entrance floor.