Contribution ID: **549** Type: **Oral (Student, In Competition) / Orale (Étudiant(e), inscrit à la compétition)**

Energy transfer dynamics in blue emitting functionalized silicon nanocrystals

Monday 15 June 2015 14:30 (15 minutes)

We use time-resolved photoluminescence (TRPL) spectroscopy to study the effects of surface passivation and nanocrystal (NC) size on the ultrafast PL dynamics of colloidal SiNCs. The SiNCs were passivated by dodecylamine and ammonia, and exhibit blue emission centered at ˜473 nm and ˜495 nm, respectively. For both functionalizations, increasing the size of the NCs from ˜3 nm to ˜6 nm did not result in a PL red-shift, but instead show an identical spectral profile. More interestingly, the nanosecond PL decay dynamics are size- and wavelength-independent with a radiative recombination rate on the order of ˜108/s, characteristic of PL from charge transfer states associated with silicon oxynitride bond. Based on TRPL and fluence-dependent measurements, we hypothesize that electrons are first photoexcited within the SiNCs and then rapidly transferred to silicon oxynitride bonds at the surface, creating charge transfer states responsible for the nanosecond blue PL.

Author: DE LOS REYES, Glenda (Physics Department, University of Alberta)

Co-authors: Prof. HEGMANN, Frank (Physics Department, University of Alberta); Prof. VEINOT, Jonathan (Chemistry Department, University of Alberta); Dr TITOVA, Lyubov (Department of Physics, University of Alberta); Ms NA, MengXing (Physics Department, University of Alberta); Dr DASOG, Mita (Chemistry Department, University of Alberta)

Presenter: DE LOS REYES, Glenda (Physics Department, University of Alberta)

Session Classification: M1-9 Ultrafast and Time-resolved Processes (DAMOPC) / (DPAMPC)

Track Classification: Division of Atomic, Molecular and Optical Physics, Canada / Division de la physique atomique, moléculaire et photonique, Canada (DAMOPC-DPAMPC)