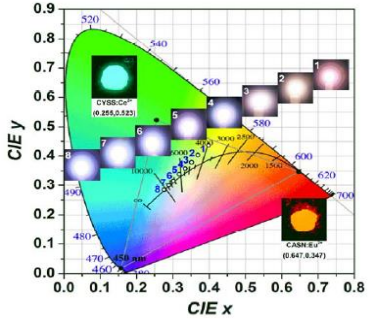
Extension: 31695 Email: tmchen@mail.nctu.edu.tw

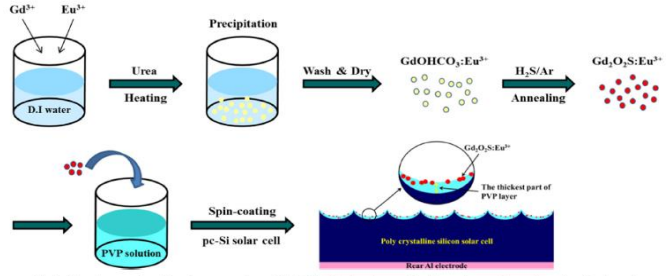
Prof. Teng-Ming Chen / Department of Applied Chemistry

Materials Chemistry of Inorganic Phosphors for Lighting, Solar Cells and Bioassay, Quantum Dots, Rare Earth Spectroscopy

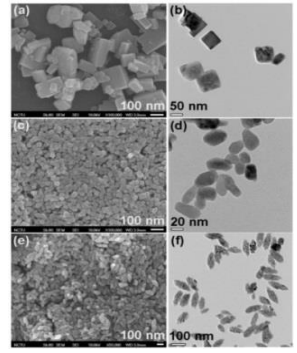
Phosphor Research Laboratory (PRL) is one of the most prominent research labs in its kind in NCTU and in this nation. We emphasize both fundamental and applied research in every aspect of luminescent materials and our primary research interests include the following four major areas: 1. Fundamental study and applications of energy transfer in luminescent materials. 2. The design, synthesis and applications of white-emitting phosphors. 3. Chemical synthesis, characterizations and luminescence of quantum dots and nanophosphors for lighting, displays and biochemical assays. 4. Efficiency enhancement of silicon solar cells through spectral conversion principle by using downshifting or upconversion phosphor materials.



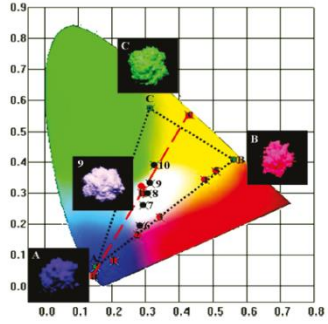
WLED with different CCT's can be fabricated using $CaY_2Si_2S_8:Ce^{3+}$ and 365 nm LED chips.



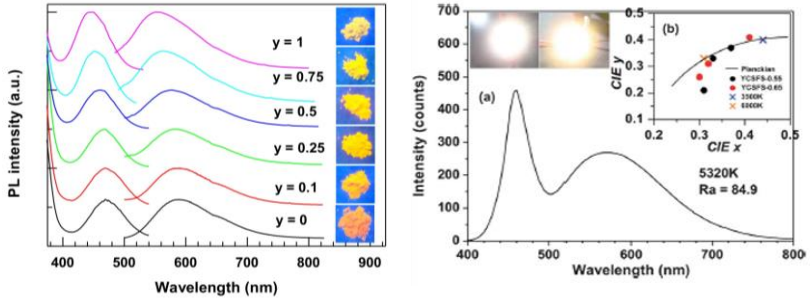
The submicron $Gd_2O_2S:Eu^{3+}$ (100-420 nm) was made using urea coprecipitation method and was dispersed in PVP to form PVP/ $Gd_2O_2S:Eu^{3+}$ to serve as a antireflecting and downshifting layer on Si solar cells. An increase of 26.2% and 26.4% in J_{sc} and η were observed, respectively. [NP]



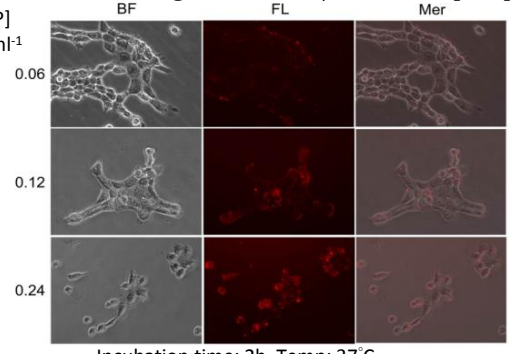
Red-emitting BPEI-YVO_4:Bi,Eu nanophosphor.



CIE coordinates of single-composition and white-emitting $Ca_3Y(GaO)_3(BO_3)_4:Ce^{3+},Mn^{2+}$, Tb^{3+} phosphor.



(Left) PL/PLE spectra of $Y_{1.98}Ce_{0.02}(Ca_{1-y}Sr_y)F_4S_2$ phosphors, which can be utilized to fabricate white-light LEDs by using 365-nm LED (right).



Incubation time: 2h, Temp: 37°C
BF=bright field, FL=fluorescence, and Mer=merged

Bioimaging of nano YVO_4:Bi,Eu used in studying cancer cell A431 in fluorescence microscopy.