

Supplementary material (ESI) for Journal of Materials Chemistry  
This journal is © The Royal Society of Chemistry 2009

**Supplementary materials**

**Up-conversion of 980 nm light into white light from sol-gel derived thin film made  
with new combination of LaF<sub>3</sub>:Ln<sup>3+</sup> nanoparticles**

**Sri Sivakumar, John-Christopher Boyer, Enrico Bovero, and Frank C. J. M. van  
Veggel\***

University of Victoria, Department of Chemistry, P. O. Box 3065, Victoria, British  
Columbia, Canada, V8W 3V6.

---

\* Corresponding author E-mail: fvv@uvic.ca

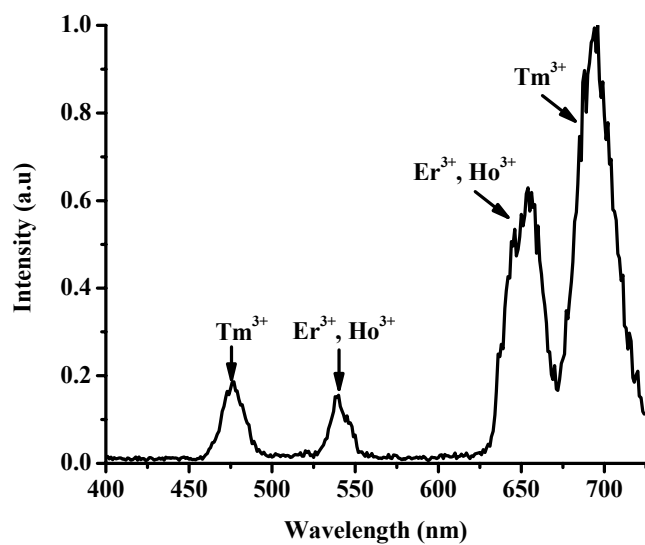


Figure S1. Up-conversion emission spectrum of silica thin film prepared at 800 °C made with nanoparticles of combination 1 (Yb/Tm, Yb/Ho, and Yb/Er) under  $\sim 65 \text{ W/cm}^2$  980 nm CW laser excitation. The CIE co-ordinates are 0.38,0.31

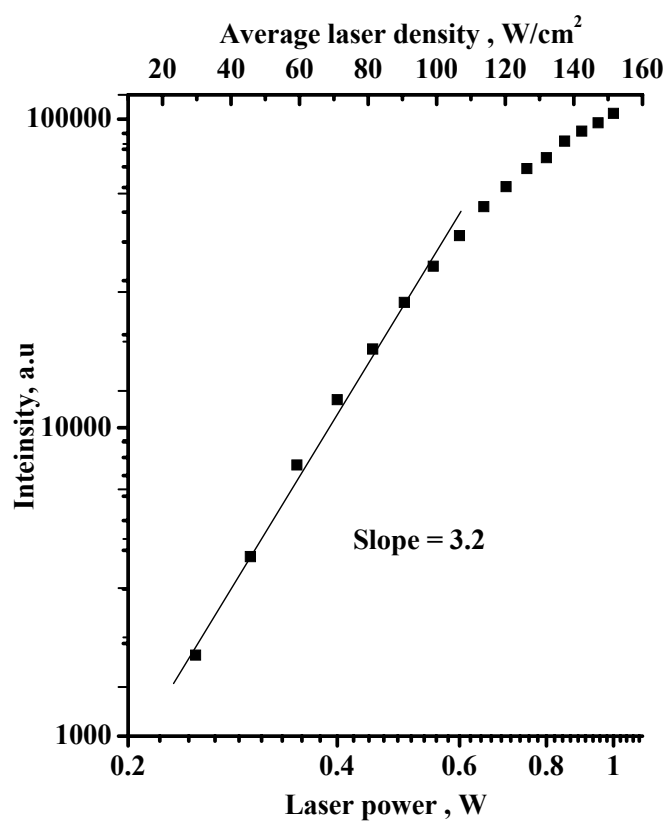


Figure S2. Dependence of the up-conversion emission intensity on the excitation power in  $\text{Yb}_{0.80}\text{La}_{0.15}\text{Tb}_{0.05}\text{F}_3$  nanoparticles individually incorporated in silica films and heated at  $800\text{ }^\circ\text{C}$  under  $980\text{ nm}$  laser excitation.

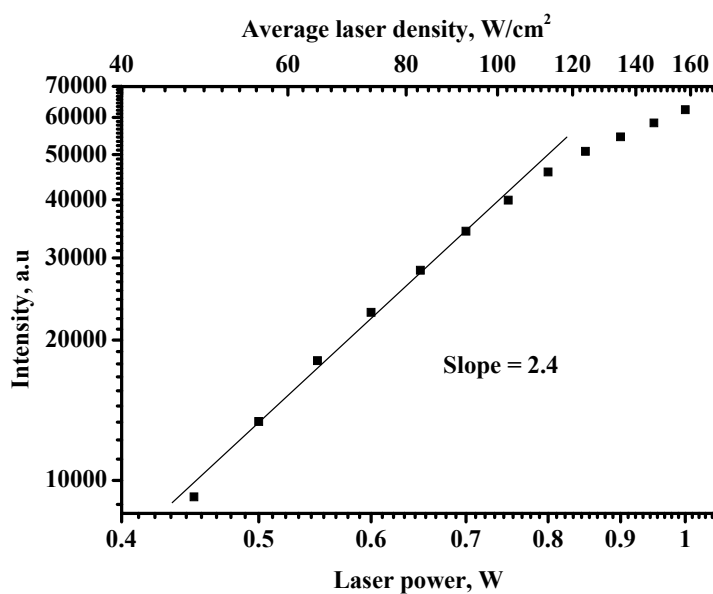


Figure S3. Dependence of the up-conversion emission intensity (sum of the  $^5D_0$  to  $^7F_1$  and  $^5D_0$  to  $^7F_2$  transitions) on the excitation power in  $\text{Yb}_{0.80}\text{La}_{0.15}\text{Eu}_{0.05}\text{F}_3$  nanoparticles individually incorporated in silica films and heated at 800 °C under 980 nm laser excitation.