

LSPR mediated improved upconversion emission on randomly distributed gold nanoparticles arrays

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1. Field emission scanning electron microscopy analysis

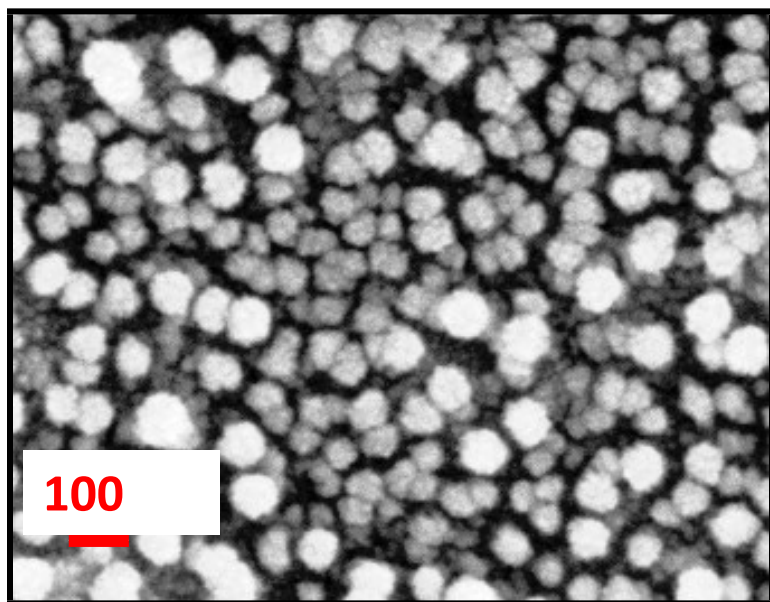


Fig. S1. Surface morphology of $\text{Gd}_2\text{O}_3: \text{Er}^{3+}/\text{Yb}^{3+}$ upconversion nanoparticles

The FESEM analysis of $\text{Gd}_2\text{O}_3: \text{Er}^{3+}/\text{Yb}^{3+}$ phosphors were carried out to investigate the surface morphology of annealed (800 °C) sample. The spherical shape of the particles was observed well, consequently, the particle size is found to be 80 to 100 nm. Due to the evenness distribution of particles, the deposition of $\text{Gd}_2\text{O}_3: \text{Er}^{3+}/\text{Yb}^{3+}$ upconversion nanoparticles into form of film were easily carried out. The lucid shape and well distinguished size of phosphors was shown in Fig. S1.