

Alloy Nanoparticles for Metal Enhanced Luminescence (MEL)

Researchers at the University of South Florida have discovered a method to demonstrate Metal Enhanced Luminescence (MEL) using alloy nanoparticles which offer additional degrees of freedom over the commonly used gold and silver nanoparticles. Optical properties of alloy nanoparticles can be tuned by changing only one experimental condition such as annealing temperature. This will potentially enable development of specifically tailored nanoparticle platforms for large MEL of a wide range of luminophores.

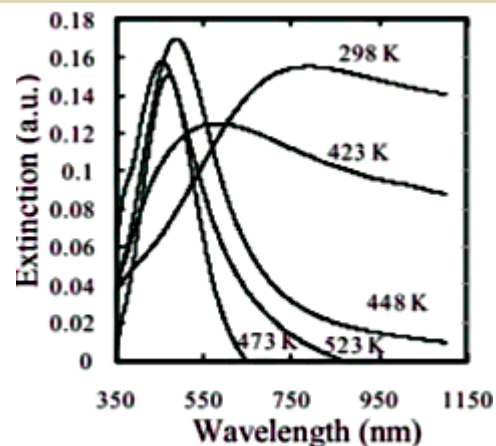
Strong luminescence intensity is one of the most important and desired properties of luminophores for their applications in different fields such as biology, chemistry, materials science and medicine. SPR wavelength is one of the most important properties which dictates the choice of materials to be used for luminescence enhancement. Metal Enhanced Luminescence is mostly demonstrated using silver and gold nanoparticles due to their strong SPR.

In this invention, alloy nanoparticles are used in MEL to achieve extremely large enhancements of luminescence intensity for any luminophore. This is achieved by tuning their SPR spectra via alteration of their atomic arrangement by changing annealing temperature. Several fields in the life sciences, chemical sciences, materials sciences, and medicine will benefit tremendously from the luminescence intensity enhancement. This technique provides a tunable, simply fabricated, nanostructured platform for such enhancement.

ADVANTAGES:

- **Amplified luminescence intensity for any luminophore**
- **One-parameter tuning of both breadth and location of the SPR spectrum peak**
- **Simply fabricable nanostructured platforms for various applications**

Enhanced Luminescence Intensity Using Alloy Nanoparticles



Normalized Extinction Spectra of Annealed Ag-Cu Nanoparticles