

# Brightly Fluorescent Europium Nanoparticles May Improve Cancer Assays

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Researchers at the University of California, Davis, have created a new type of nanoparticle that could be used in tests for medical diagnostics, environmental pollution, and contamination of food products. The particles, about 100 to 200 nanometers in size, are luminescent, magnetic, and inexpensive to make, and can be tagged with antibodies designed to detect cancer-associated proteins.

The new nanoparticles, described in a paper published in the journal *Nanotechnology*, are made using a low-cost, high-capacity process known as spray pyrolysis. In spray pyrolysis, raw materials are mixed in a solvent and then sprayed through a flame. This method is already used in the chemical industry to make products such as fumed silica and carbon black.

The resulting nanoparticles have a magnetic core of iron oxide or iron/neodymium/cobalt oxide coated in a shell of europium and gadolinium oxide. When stimulated with a laser, europium emits red light at a very specific wavelength. The investigators, led by Ian Kennedy, Ph.D., note that they can also label these nanoparticles with other fluorescent labels in different colors. The built-in europium-triggered luminescence acts as an internal standard, making it easier to carry out accurate quantitative assays, explains Kennedy.

Because of their iron-based core, the nanoparticles also produce a significant magnetic signal that can be detected using magnetic resonance imaging. The nanoparticles' magnetic properties can be used

to separate them in various analytical assays. The particles can also be coated with short pieces of DNA and used for genetic analysis, including tests for cancer-related genes.

This work is detailed in a paper titled, “Magnetic/luminescent core/shell particles synthesized by spray pyrolysis and their application in immunoassays with internal standard.” This work was published online in advance of print publication. An abstract of this paper is available at the [journal’s website](#).

Source: National Cancer Institute

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