

ABSTRACT

An approach to hyperthermia for cancer treatment based on multiphonon relaxation of optical excitation in rare-earth (particularly Dy³⁺) doped nanocrystals after laser irradiation allows fast and accurate local heating to a preset temperature. A collection of nanoparticles suitable for use in hyperthermia treatment of cancerous and non-cancerous cells by laser irradiation in the wavelength of the transparency window of biological tissue (800nm – 1300 nm) preferably 800 – 900 nm is provided, where each nanoparticle comprises a crystalline host structure, and at least one species of rare-earth dopant ion.