**Engineering Luminescent Nanoparticles for Tumour Localization and Theranostics**

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To track nanoparticle distribution in vivo is important to disclose its functionality and potential risk for biomedical application. In this research, we design a kind of dual-band luminescent nanoparticle, with emission in visible and near infrared simultaneously. These nanoparticles are investigated as an integrated platform for tumor therapy and imaging which can be triggered with a single wavelength. A core/shell structure, with NaGdF4:Yb,Er and NaGdF4:Nd,Yb as core and shell parts respectively, was responsible for UC visible emissions and downshifting NIR emissions. Conjugated with a sensitizer, rose Bengal molecule, the visible emissions in green was used to trigger singlet oxygen generation in vitro and in vivo photodynamic treatments. Benefit from the NIR emission, an imaging route to track the location of the NPs during therapy was developed. In addition, these nanoparticles showed much lower heating effect under continuous laser irradiation for a relatively long time. These conjugates demonstrated a novel detect-to-treat modality which has potentials in tumor theranostic studies.

**References**

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**Biography**

Ling-Dong Sun is currently a professor at State Key Lab of Rare Earth Materials Chemistry and Applications of Peking University (PKU). She received her Bachelor’s degree in Harbin Normal University, and both her M.Sc. and PhD in Changchun Institute of physics, Chinese Academy of Sciences. She was a postdoc fellow at Peking University from 1996 to 1998. Her research focuses on (1) Solution route towards rare earth and noble metal nanocrystals, and 2D or 3D self-assemble architectures; (2) Luminescent rare earth nanocrystals, upconversion and downshifting for multicolor/multifunction detection and imaging. (3) External field effect on the excited states and radiation transition probability of luminescent semiconductor and rare earth nanocrystals. She has won many awards, such as, The National Award of Science and Technology Progress, the 2nd Grade (1999), “Youth Chemistry Prize” by China Chemical Society (2005), "Research Prize for Youth Scientists" awarded by the Hok Ying Dong Education Foundation (2006), and "Youth Science Award" by China Association for Science and Technology (2007), Distinguished Young Researcher (2014).

