

Abstract Submitted
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Improve the Optical Properties of Yb/Er: NaGdF₄ Nanocrystals

LEI LEI, China Jiliang University, HOWARD LEE, Texas AM University, College Station, CHINA JILIANG UNIVERSITY, HANGZHOU, P. R. CHINA TEAM, DEPARTMENT OF PHYSICS, BAYLOR UNIVERSITY, WACO, TX 76798, UNITED STATES TEAM, THE INSTITUTE FOR QUANTUM SCIENCE AND ENGINEERING, TEXAS AM UNIVERSITY, COLLEGE STATION, TX 77843, TEAM — Ln³⁺-doped NaGdF₄ UC nanocrystals (NCs) have been widely investigated as bio-imaging and magnetic resonance imaging agents recently. We provide a facile and straightforward strategy to modify the size and uniformity of NaGdF₄ NCs *via* alkaline-earth doping for the first time. By increasing of alkaline-earth doping content, the size of NaGdF₄ NCs increases gradually, while the size-uniformity is still retained. Importantly, adopting the Ca²⁺-doped Yb/Er: NaGdF₄ NCs as cores, the complete Ca/Yb/Er: NaGdF₄@NaYF₄ core-shell particles with excellent size-uniformity can be easily achieved. As a result, UC emission intensity of the complete core-shell NCs increases for about 30 times in comparison with that of the cores, owing to the effective surfaces passivation of the Ca²⁺-doped cores and therefore protection of Er³⁺ in the cores from the non-radiative decay. To further enhance the upconversion efficiency, we are combining the core-shell NCs and gold NCs into nano-structured optical fiber that provide an unique and novel platform for studying NC UC effects.

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