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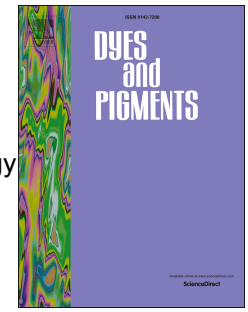

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Bright white-light upconversion from core-shell nanocrystals through interfacial energy transfer

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Abstract

Photon upconversion of lanthanides is one of important approach for white light emission, however, so far the most efficient white light upconversion is limited in the use of the Yb-Tm-Er and Yb-Tm-Ho tridoping systems. Here, we report a new mechanistic approach for white light upconversion in lanthanide-doped core-shell nanocrystals through using the interfacial energy transfer (IET) for the first time. By constructing the $NaYbF_4$:Tm/Gd@$NaYF_4$:Tb/Eu core-shell nanostructure, bright white light upconverting emission has been realized under 980 nm excitation through the way of IET. These white light upconversion nanocrystals show uniform sphere morphology with an average size of 27.9 nm and are in hexagonal phase. Our results offer a new experimental strategy for white light upconversion of lanthanides which hold great promise in diverse frontier applications such as 3D displays and biophotonics.