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Measurement of Quantum Yield and Upconversion Brightness in Red, Blue and Green on NIR Excited M_2O_2S:Yb/Er/Ho/Tm Phosphors[1]

IVAN BEEKS, AJITH G. KUMAR, DHIRAJ K. SARDAR, Univ of Texas, San Antonio — A series of broadly color tunable upconversion phosphors were synthesized from M_2O_2S (M=Y,Gd,La) using a flux fusion method. We investigate their upconversion properties as a function of the dopant concentrations and excitation power density. The phosphor compositions were determined for their upconversion characteristics under 800, 980 and 1550 nm excitations. By measuring the quantum yield and luminous brightness, we investigate their potential applications in biomedical imaging as well as NIR display applications. Results are compared with the well-known upconversion phosphor $NaYF_4$:Yb/Er/Ho/Tm and found that the M_2O_2S phosphor systems are more efficient compared to $NaYF_4$. By adopting various synthesis protocols, we were able to examine M_2O_2S in the size range of 10 nm to 10 μm.

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Ivan Beeks
Univ of Texas, San Antonio

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