Structural Topotactical Transformation Synthetic Strategy for $Y_2O_2S:Ln^{3+}$ Micro/nanocrystals with Multicolor Emissions

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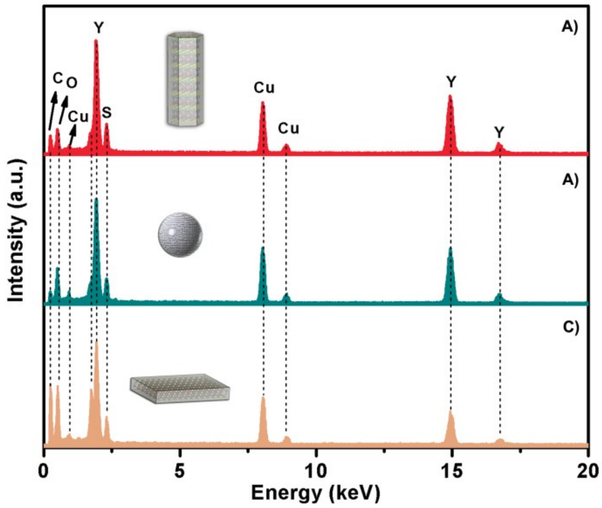

Fig S1 EDX spectra of the three Y_2O_2S samples with microprism (A), submicrosphere (B), and nanosheet (c). The presences of the C and Cu elements are due to the copper grid substrate.

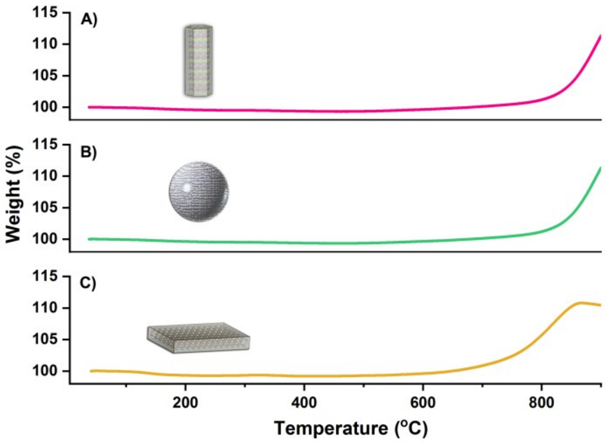

Fig S2 TGA curves of the three Y_2O_2S samples with microprism (A), submicrosphere (B), and nanosheet (c). The weight loss before 200 °C is due to the remove of the absorbed water on the surface; the weight increase at about 800 °C is due to the oxidization of Y_2O_2S with the reaction of $Y_2O_2S + O_2 \rightarrow Y_2O_2SO_4$.

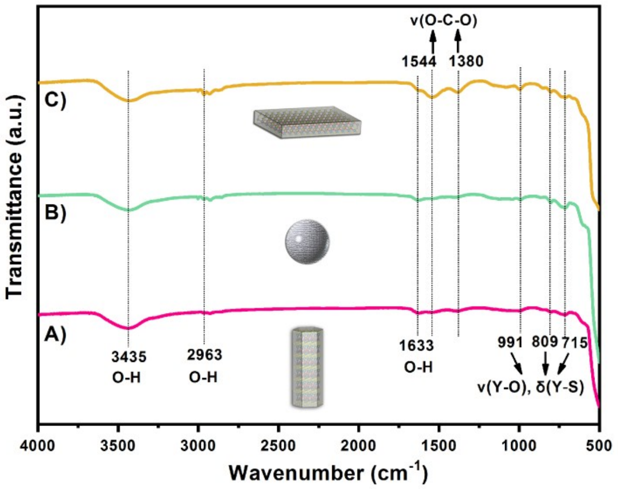

Fig S3 FTIR spectra of the three Y_2O_2S samples with microprism (A), submicrosphere (B), and nanosheet (c). The broad absorption band near 3435 cm^{-1}, the weak absorbance peak around 2963 cm^{-1} and 1633 cm^{-1} could be attributed to the O-H stretching in H_2O molecular, indicating the existence of adsorbed water on the surface of Y_2O_2S samples. The absorption peaks around 1544 cm^{-1} and 1380 cm^{-1} result from O-C-O asymmetrical stretching vibration which was caused by absorbed CO_2 from ambient atmosphere on the surface or the pores of the Y_2O_2S sample. The absorption peaks in the regions around 991, 809 and 715 cm^{-1} may signify the presence of [ν(Y-O), δ (Y-S)] modes, (*Analytical Chemistry*, 1950, 22, 1478-1497). We found there's no nitrogen element in the EDX, so there would not have the S and Nitrate binding peaks.

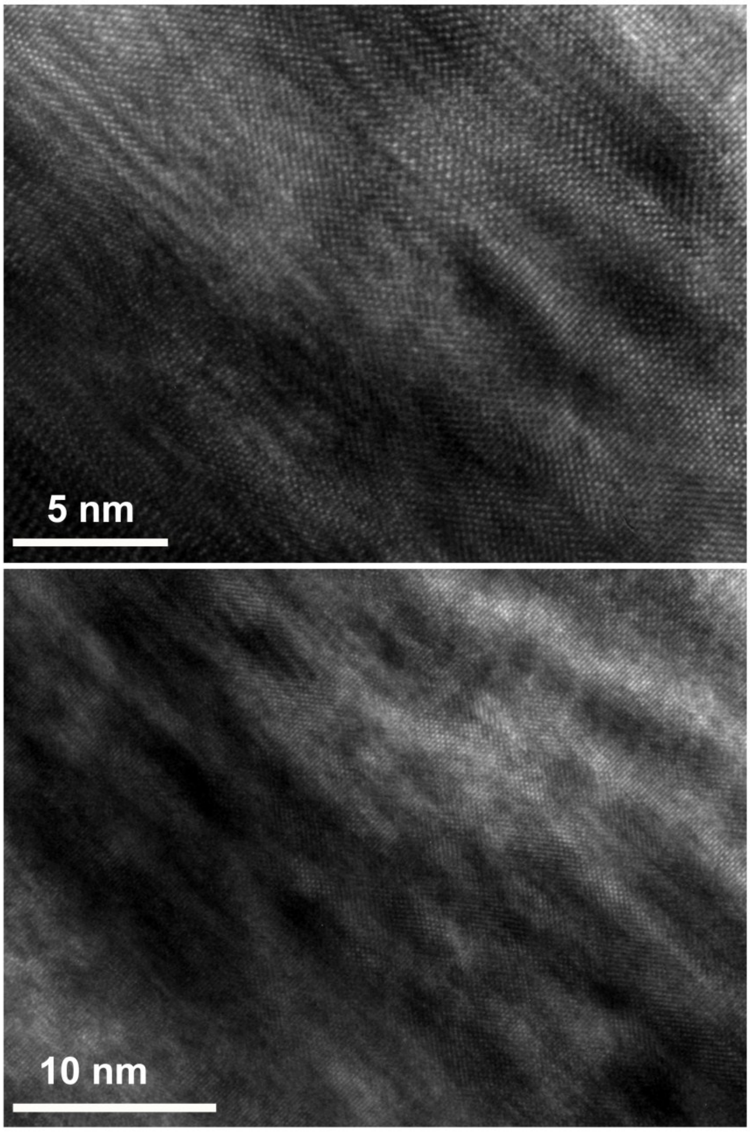

Fig S4 PL HRTEM images of the Y_2O_2S microprism in the middle part of the prism body.

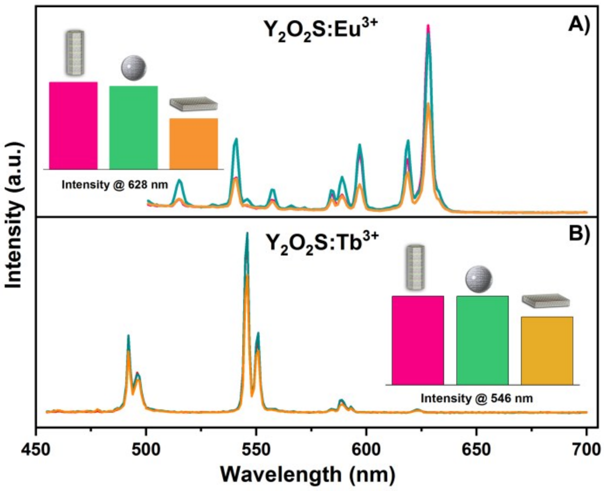

Fig S5 PL spectra of the as-prepared Y_2O_2S:3%Eu^{3+} (A) and Y_2O_2S:3%Tb^{3+} (B) samples with three different morphologies of microprism, sub-microsphere, and nanoplate. Inset panels are corresponding contrast diagrams of the emission intensity at 628 nm for (A) and 546 nm for (B), respectively.