

Electronic Supporting Information

A facile method for effective doping of Tb³⁺ into ZnO nanocrystals

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Experimental Methods. Tb³⁺-doped ZnO/ZnO core/shell structured nanocrystals were synthesized in a two-step process. In the first step, Tb³⁺(4.0 at%)-doped ZnO core nanocrystals with an average size of 7~8 nm were prepared according to a modified sol-gel method²² while keeping the molar ratio of LiOH·H₂O/Zn²⁺ at 2, and this sample will be named as ‘core not annealed’ later on if not otherwise stated. In the second step, the obtained Tb³⁺-doped ZnO core nanocrystals were dispersed in 100 mL ethanol and stirred for several hours to form uniform suspensions, followed by alternating dropwise addition under constant stirring of 50 mL ethanol solutions (half concentration of those used in step one) of zinc acetate and lithium hydroxide. The mixture was allowed to grow at room temperature for 15 h and then n-heptane was added. The precipitation-redispersion procedure was used as in step one for two more times and the precipitate was vacuum-dried and annealed in air at different temperature for 2 h. The samples as prepared without annealing and with annealing at 400°C for 2 h will be named later on as ‘core-shell not annealed’ and ‘core-shell annealed’, respectively. For comparison, the sample of ‘core not annealed’ was annealed at the same experimental conditions as the core-shell samples, and will be named as ‘core annealed’ later on. The products were characterized by TEM (JEM-2010, 200 kV), XRD (Philips X’Pert Pro, Cu K α), optical absorption spectroscopy (SolidSpec-3700 with an integral sphere detector), and PL spectroscopy (Jobin Yvon Fluorolog-3-TAU using a 450 W Xe lamp as the continuous light irradiation source).

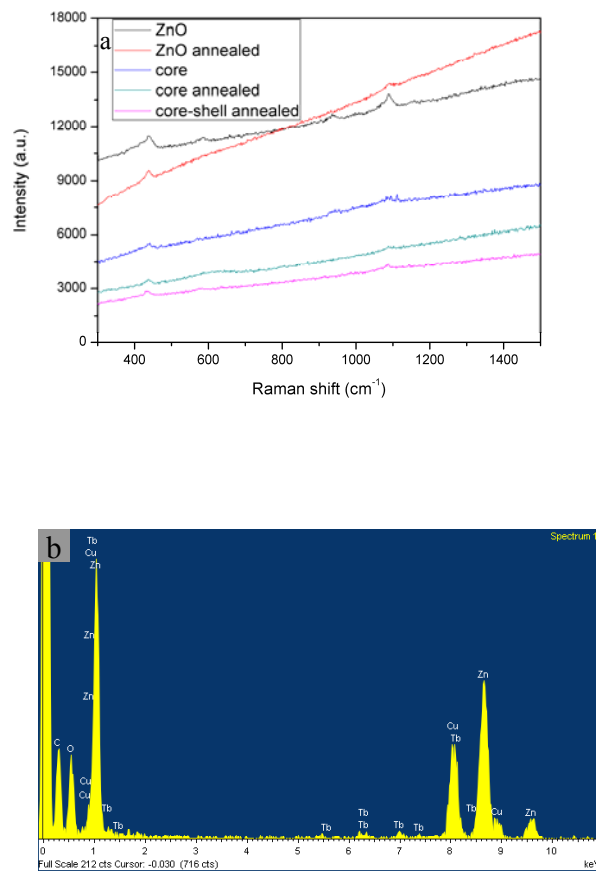


Fig. S1 (a) Raman and (b) EDS spectra of terbium doped ZnO nanocrystals.

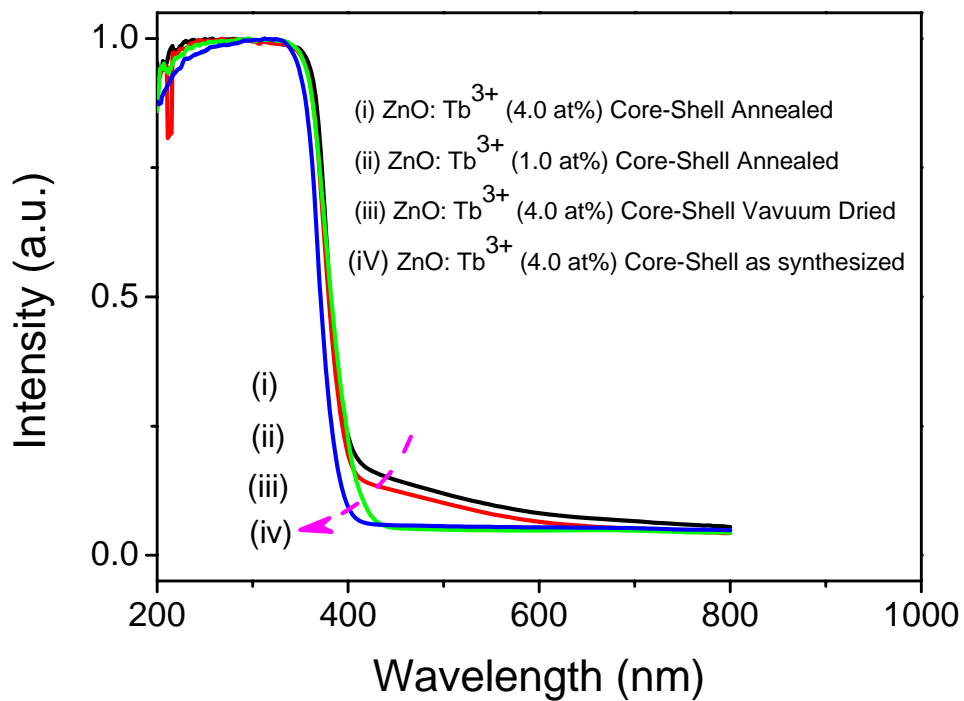


Fig. S2 Optical absorption of doped ZnO samples.