## Supporting Information

Controllable synthesis of undoped and doped calcium niobate nanocrystals for tailored structural, electronic and luminescent properties

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Figure S1 TEM (a) and HRTEM (b) images of 14.6 nm Ca<sub>2</sub>Nb<sub>2</sub>O<sub>7</sub> nanocrystals.

As shown in Figure S1a,  $Ca_2Nb_2O_7$  nanocrystals show aggregated properties with a sheet-like morphology. HRTEM image indicates that  $Ca_2Nb_2O_7$  nanocrystals were fully crystallized into tiny crystals.



Figure S2 HRTEM image of 19.2 nm  $Ca_2Nb_2O_7$  nanocrystals



Figure S3 IR spectra of the as-prepared  $Ca_2Nb_2O_7$  nanocrystals prepared at different pH value. (a) pH = 5, (b) pH = 7, (c) pH = 9, (d) pH = 11, (e) pH = 13.



Figure S4 EDS data of as-prepared  $Ca_2Nb_2O_7$ :K<sup>+</sup>/Eu<sup>3+</sup> nanocrystals prepared at different pH =9.



Figure S5 XRD patterns of XRD patterns of  $Ca_2Nb_2O_7$ :K<sup>+</sup>/Eu<sup>3+</sup> nanocrystals prepared at different pH value: (a) pH = 5, (b) pH = 7, (c) pH = 9, (d) pH = 11, (e) pH = 13.

As shown in Figure S5, all XRD patterns show similar diffraction peaks as that of undoped  $Ca_2Nb_2O_7$  nanocrystals. With increase of pH value, the FWHMs of (222) diffraction peak for  $Ca_2Nb_2O_7$ :K<sup>+</sup>/Eu<sup>3+</sup> nanocrystals were determined to be 0.299°, 0.374°, 0.432°, 0.476°, and 0.545°, respectively. Finally, the particle sizes were calculated to be 27.4, 22.0, 19.0, 17.1, and 15.0 nm, respectively. This indicates the foreign dopant ions showed little impact on the particle size of  $Ca_2Nb_2O_7$  nanocrystals.