

Up-conversion characteristics BaTiO₃:Ho/Yb nanoparticles prepared by spray pyrolysis

유정은, 배채환, 정경열[†]

공주대학교

(kyjung@konju.ac.kr[†])

Up-conversion (UC) phosphor that can convert near-infrared light to visible light are used in a variety of applications, including bio-imaging, solar cells, temperature sensors, and anti-counterfeiting. The emission characteristics of UC phosphors strongly depend on the type of host. Therefore, there are many efforts to find new hosts that have low phonon energy and can be easily synthesized using non-toxic compounds without special conditions. Considering this, perovskite-type ATiO₃ (A = Ca, Ba, Sr) is a good candidate as a host for UC phosphors because of its low phonon energy (440 ~ 450 cm⁻¹). In this work, Ho³⁺/Yb³⁺ co-doped BaTiO₃ UC nanoparticles were synthesized using spray pyrolysis assisted citric acid, and the UC properties were investigated by changing the Ho³⁺ and Yb³⁺ concentrations. In addition, we investigated the effect of Zn²⁺ substitution into Ba sites on the up-conversion properties. Finally, the resulting UC nanoparticles were used to make a security mark and found that the green emission was high enough to be detectable with the naked eye under 980 nm IR illumination.