

Fabrication of emissive pearl pigment using Gd₂O₃:Tb nanoparticles for anti-counterfeiting application

윤성혜, 민병호, 정경열[†], 김대성¹, 조금성², 강광중², 최병기²
공주대학교; ¹한국세라믹기술연구원; ²(주)CQV
(kyjung@kongju.ac.kr[†])

Pearl pigments have been used in cosmetics, automotive metallic coating, and different appliances with sparkling properties. The unique sparkling and color properties of pearl pigments depend on the viewing angle positions. So, the pearl pigment itself can be used as a security material. The anti-counterfeiting technology requires multi-functional materials which are difficult to duplicate. Given this, it is necessary for pearl pigments to have functions other than their optical properties. To prepare more advanced security material, in this work, the pearl pigment was coated with green emissive nanoparticles (Gd₂O₃:Tb). Nano-sized Gd₂O₃:Tb particles were synthesized by spray pyrolysis, and its emission was improved by controlling the synthetic conditions including activator concentration, calcination environment, and flux content. The resulting Gd₂O₃:Tb particles showed high intensive green emission and average particles size of less than 200 nm. Finally, the pearl pigments coated with Gd₂O₃:Tb nanoparticles were confirmed to have good green emission under UV illumination.