

Next-Generation Perovskite Nanocrystal Scintillator for X-Ray imaging

허진혁, 임상혁[†]

고려대학교

(imromy@korea.ac.kr[†])

To date, the indirect-type X-ray detectors have widely been used in the common flat panel X-ray detectors consisted of a scintillator and a Si-PD array because they are much cheaper and more stable than the direct-type detectors. Here, we demonstrated commercializable and cost-effective next-generation CsPbBr₃ perovskite nanocrystals (PNCs) based X-ray detectors. The PNCs-based X-ray detector exhibits higher spatial resolution (9.8 lp mm⁻¹ at modulation transfer function (MTF) = 0.2 and 12.5–8.9 lp mm⁻¹ for a linear line chart), faster response time (≈ 200 ns), and comparable stability (> 40 Gyair s⁻¹ of X-ray exposure) compared with the commercialized terbium-doped gadolinium oxysulfide (GOS)-based detectors (spatial resolution = 6.2 lp mm⁻¹ at MTF = 0.2 and 6.3 lp mm⁻¹ for a linear line chart, response time = ≈ 1200 ns) because the PNCs-based scintillator has ≈ 5.6 -fold faster average photoluminescence lifetime and stronger emission than the GOS-based one.