

Ultraviolet light sensor based on graphene quantum dots/reduced graphene oxide hybrid film

Tran Van Tam, 최원목†

울산대학교

(wmchoi98@ulsan.ac.kr†)

Here, we demonstrate a high performance ultraviolet (UV) light sensor based on graphene quantum dots (GQDs)/reduced graphene oxide (RGO) hybrid film with a simple and inexpensive solution process. To fabricate the GQDs/RGO hybrid film, GQDs synthesized by the carbonization of citric acid are simply sprayed on RGO film prepared by spin-coating on a SiO₂/Si substrate. The RGO film is employed as the transport channel of the photogenerated electrons from GQDs due to its superior electron mobility and conductivity. By the integration of GQDs and RGO, the UV sensor device shows a high photo responsibility of 8.7×10^2 A/W and an excellent specific detectivity of 7.7×10^{13} Jones at a low operating voltage. These results are attributed to the strong absorption of GQDs and the photogenerated charge transfer to RGO. Our novel approach based on the integration of GQDs and RGO can be extended for the design of the other promising optoelectronic applications.