Carrier Dynamics in Assembled Anisotropic Semiconductor Nanocrystals

김휘동, 이도창†
한국과학기술원 생명화학공학과
(dclee@kaist.ac.kr†)

Anisotropic semiconductor nanocrystals (NCs) have garnered a great deal of attention, due to their unique optical properties. Recent advances in the synthesis of anisotropic NCs enabled the study of the characteristics of this novel class of anisotropic nanostructures. Notwithstanding the progress, the extensive study of these properties in assembled structure has been lacking.

In this study, we examine exciton dynamics in anisotropic NC films with delicate control of assembled structure. The anisotropic NCs enable to forms a relatively varying assembled structures compared to spherical NCs because of geometric characteristics. Based on the control of sophisticated interactions between NCs, we prepared varying assembled structures such as vertex, helical and micro-needle superstructure using nanorods and nanoplatelets. From the time-resolved photoluminescence spectroscopy results, it reveals that the assembly structure has profound influence on the energy transfer (ET) rate within the anisotropic NCs assembly. The change in ET rate was discussed in terms of inter-particle distance, dipole orientation and absorption coefficient of anisotropic NCs.