Exciton Dynamics of Cation-Exchanged CdSe/PbSe Nanorod Type-II Structures with Defect Sites

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In this study, we prepared CdSe/PbSe heteronanostructures via cation exchange of CdSe NRs to investigate excition behavior of CdSe/PbSe heteronanorods. Transient absorption (TA) spectroscopy study shows that CdSe/PbSe NRs have type II structure with staggered band offset. However, the CdSe/PbSe heteronanorods do not have prolonged lifetime compared with CdSe NRs, different from typical type II structure. It is revealed that there are many excition trapping sites caused by defects occurring in the process of cation exchange. The study on defects from cation-exchanged materials develops and broadens the strategy for application to photocatalysis and photoelectrochemistry.