

Abstract Submitted
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Electronic transport in graphene/CdSe nanoparticle monolayer/graphene tunneling devices DATONG ZHANG, Columbia University, CHENGUANG LU, National Center for Nanoscience and Technology, AREND VAN DER ZANDE, PHILIP KIM, IRVING P. HERMAN, Columbia University — We fabricated graphene/CdSe nanoparticle monolayer/graphene sandwich device structures. The CdSe nanoparticle monolayer is formed on a liquid-air surface before transferring it onto the bottom graphene layer that had been micro-exfoliated onto a 285 nm SiO₂/Si substrate. The top graphene layer is transferred to the targeted area on the CdSe nanoparticle monolayer via a dry transfer technique. Tunneling-type vertical transport is observed, which is fitted by tunneling models that suggest that ligand shell instead of nanoparticle core is the major barrier of tunneling. Photoconductivity is enhanced but with low exciton separation efficiency when the laser is on the junction area, also suggesting that ligand shell is the major barrier of electronic transport in the sandwich structure.

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