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Light Generation and Harvesting in a Van der Waals Heterostructure[1] ORIOL LÓPEZ SÁNCHEZ, ESTHER ALARCON LLADO, VOLODYMYR KOMAN, ANNA FONTCUBERTA I MORRAL, ALEKSANDRA RADENOVIC, ANDRAS KIS, EPFL - Lausanne, INSTITUTE OF MATERIALS SCIENCE COLLABORATION, INSTITUTE OF MICROTECHNOLOGY COLLABORATION, INSTITUTE OF BIOENGINEERING COLLABORATION — We report on the realization of light-emitting diodes based on heterojunctions with monolayer MoS_2. Careful interface engineering allows us to realize diodes showing rectification and light emission from the entire surface of the heterojunction. Electroluminescence spectra show clear signs of the A and B excitons and the A-trion resonance related to the optical transitions between the conduction and valence bands. Our pn diodes can also operate as solar cells with an external quantum efficiency higher than 2%. Our work opens up the way to more sophisticated optoelectronic devices such as 2D LEDs and solar cells based on monolayer MoS_2.

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