Thickness Dependent Solar Cell Efficiency of Layered Materials: Transition Metal Dichalcogenides

Layered materials attracted a lot of attention due to the fact that they can be reduced to two dimensions. Although application of 2D materials as excitonic solar cell have been computationally demonstrated, application of nano scale layered materials as conventional solar cell have not been studied except our work. We have updated the Shockley-Queisser limit calculation which makes it possible to calculate thickness dependent solar cell efficiency. We calculated the thickness dependent solar cell efficiency of layered materials transition metal dichalcogenides. We find that WS2 has the highest efficiency, higher than silicon, in micrometer scale and MoTe2 has the highest efficiency in the nanometer scale which is much higher than efficiency of silicon in the same thickness scale.