

Hot-carrier cooling and relaxation processes in perovskites and semiconductor quantum dots

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Understanding and controlling the hot-carrier cooling and relaxation processes in semiconductor materials are very important to improve their optoelectronic devices performance such as solar cells, particularly under high current/carrier density condition.

Herein, we will report our recent works on transient absorption measurements to reveal the mechanism affecting the dynamics of hot-carrier cooling and the intricate competition among various ultrafast relaxation processes such as Auger effect, bandgap renormalization and free-carrier Stark effect for the excited carriers in perovskite films and HgTe quantum dots.