

Metal-halide perovskites for photovoltaic and light-emitting devices*



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Abstract: Metal halide perovskites are exotic hybrid crystalline materials developed out of curiosity. Unexpectedly, solar cells incorporating these perovskites are rapidly emerging as serious contenders to rival the leading photovoltaic technologies. Power conversion efficiencies have jumped from 3% to over 20% (certified) in the last three years. Closely following the solar cell development, the light-emitting properties of perovskite semiconductors have also been reinvigorated. Here, I will give a general overview of the rapid progress in perovskite devices. I will present recent advances here and elsewhere to better understand the operation of the state-of-the-art solar cells and the properties that have delivered high performance light-emitting diodes (LEDs) and lasers. I will cover topics including charge carrier diffusion and recombination mechanisms, as well as ion migration and its potential impact on device performance and hysteresis. Understanding these processes is key to further development of the field and to bringing the perovskite technology to commercialization.

*This talk is the first of the Perovskites Seminar Series organized by Sam Stranks and sponsored by the Center for Excitonics. For more info contact Sam: stranks@mit.edu