



## Our Recent Progresses in Perovskite Solar Cells and Perovskite Quantum Dots

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Recently, halide perovskite materials have attracted extensive attentions because of their unique physical properties and great application potentials in the fields of solar cells, light emission diodes and photoelectric detectors. Here, we present some of our recent results on improving the photoelectric properties of perovskite solar cells and expanding photoluminescent properties of perovskite quantum dots through rare earth doping or insulating various rare earth doped nanophosphors. By introducing down-conversion or up-conversion phosphors, the power conversion efficiency of the perovskite solar cells are highly enhanced, and the light stability and long-time stability of the cells are considerably modified. In addition, the solar cells with storage function are developed. It should be also highlighted that through doping rare earth ions into lattices of the perovskite quantum dots, a novel type of quantum cutting phosphors with quantum yield close to 200% are discovered, which can largely improve the power conversion efficiency of c-Si and thin solid film solar cells.

### SHORT BIO:

Professor Hong-Wei Song received his Bachelor degree in Physics from Jilin University in 1989. He got his Ph.D. Degree in Condensed Material Physics from Changchun Institute of Physics, Chinese Academy of Science (CAS) in 1996. From 1996 to 2000, he worked as a post-doctoral researcher in Institute of Physics, CAS; Nagoya Institute of Technology, University of California at Berkeley, in turn. In 2000, he was nominated as the member of One Hundred Talent Project of CAS, and joined Laboratory of Excited State Physics, CIOMP as a professor. He has been working as a professor of physical electronics in Jilin University since 2007. He obtained the financial support of National Talent Youth Foundation in 2009. He received Second Award, Natural Science Award of Education Ministry in 2008; First Award, Science and Technology Award of Jilin Province in 2010; Second Award, the National Award for Natural Sciences in 2011. He was nominated as one of Leading Talents in Science and Technology, Ten Thousand Talent Project in 2019. From 2014 to 2018, he was ranked in List of Highly Cited Scholars in China. He is the author and co-author of more than 320 publications in scientific international journals with total citations > 8500, h-index: 53. He has more than ten granted patents.