

Allgemeines Physikalisches Kolloquium

Donnerstag, 21.11.2020 um 16 Uhr c.t.

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Optical materials for applications in optoelectronics

In this talk, a variety of approaches to prepare and integrate photonic materials in energy conversion devices will be presented. Photonic crystals, aperiodic media, plasmonic nanostructures, corrugated surfaces and optically disordered media are among the different kinds of materials that will be discussed. For each case, a specific example of integration in a device and its effect on the related energy conversion process (namely, luminous to electric, electric to luminous, luminous to thermal, luminous to luminous) will be presented. A detailed analysis of the mechanisms by which efficiency enhancement or other added functionality is provided by these materials will also be given.

Some related references:

- [1] Localized Surface Plasmon Effects on the Photophysics of Perovskite Thin Films Embedding Metal Nanoparticles. A. Bayles, L. Caliò, S. Carretero-Palacios, G. Lozano, M.E. Calvo, H. Míguez, J. Mater. Chem. C **2019**, in press.
- [2] Absorption and Emission of Light in Optoelectronic Nanomaterials: The Role of the Local Optical Environment. A. Jiménez-Solano, J.F. Galisteo-López, H. Míguez, J. Phys. Chem. Lett. **2018**, 9, 2077.
- [3] Photonic Tuning of the Emission Color of Nanophosphor Films Processed at High Temperature, D. Geng, G. Lozano, M.E. Calvo, N. Nuñez, A.I. Becerro, M. Ocaña, H. Míguez, Adv. Opt. Mater. **2017**, 5, 1700099.
- [4] Plasmonic Nanoparticles as Light-Harvesting Enhancers in Perovskite Solar Cells: A User's Guide" S. Carretero-Palacios, A. Jiménez-Solano, H. Míguez. ACS Energy Lett. **2016**, 1, 323.
- [5] Highly Efficient Perovskite Solar Cells with Tunable Structural Color W. Zhang, M. Anaya, G. Lozano, M.E. Calvo, M.B. Johnston, H. Míguez, H.J. Snaith. Nano Lett. **2015**, 15, 1698.