



第186回 OPERA研究交流セミナー

第177回 ISIT有機光エレクトロニクス研究特別室セミナー

第244回 未来化学創造センターセミナー



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From Nanomaterials to Photovoltaic Devices

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Functional nanomaterials find potential usage in several technological applications in energy and environment sectors. The focus of the present talk is to discuss briefly the application of functional nanomaterials in three important third generation PV technologies a) Spectral Conversion¹, b) Dye-sensitized Solar Cells² and c) Perovskite Solar Cells³.

One generic approach to address the fundamental losses arising from the mismatch between the incident photon energy and the cell bandgap (or the absorption threshold) is via manipulating the sunlight prior to conversion also terms as *Spectral conversion*. In this talk I will discuss my contributions to utilizing up-conversion mechanism to enhance the IR response of Si solar cells.¹

The predominant trend in designing new organic dyes for dye sensitized solar cells (DSSCs) has been to combine an electron withdrawing group (acceptor, A) on one side of a conjugated π -spacer and one or more electron-donating groups (donor, D) on the other side, which generate a donor- π -acceptor (D- π -A) dye. I will discuss my contribution to demonstrate “donorfree” dye (π -A) with power conversion efficiency competitive with the state-of-the-art D- π -A dyes.²

Spiro-OMeTAD is one of the most commonly used hole transport material (HTM) materials in perovskite solar cells with record efficiency > 20%. However, the tedious synthetic procedures and purification processes of the of spiro-bifluorene core make it cost ineffective and thus limit its application and commercialization. In this talk I will discuss my contributions to the development of novel spiro[fluorene-9,90-xanthene] (SFX) based HTM which is as efficient as the commercial counterpart but is five times cheaper.³

主催: 九州大学 最先端有機光エレクトロニクス研究センター

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