

KEYWORDS: Organic photovoltaics, nonfullerene acceptors, vertical phase separation, potassium, DFT calculation P hotovoltaics are among the most promising devices for use as renewable technologies for enhancing future energy supplies. In particular, solution-processed organic photo-voltaics (OPVs) with bulk-heterojunction (BHJ) structures

Organic photovoltaic cells (OPVs) consist of a nanostructured blend of donor (D) and acceptor (A) semiconductors (1, 2). Photons absorbed in either material create molecular excitons, which can dissociate at the D-A heterojunction into holes on D and electrons on A (3, 4). The hole and electron are still subject to their mutual Coulomb interaction and can self-trap ...

The most efficient thin-film solar cells made with organic materials are blends of semiconducting polymers and fullerenes called the bulk heterojunction (BHJ). ... Phase separation in bulk heterojunctions of semiconducting polymers and fullerenes for photovoltaics *Annu Rev Phys Chem.* 2014;65:59-81. doi: 10. ...

Organic photovoltaics (OPVs) need to overcome limitations such as insufficient thermal stability to be commercialized. The reported approaches to improve stability either rely on the development of new materials or on tailoring the donor/acceptor morphology, however, exhibiting limited applicability. Therefore, it is timely to develop an easy method to enhance ...

Herein, the impact of the independent control of processing additives on vertical phase separation in sequentially deposited (SD) organic photovoltaics (OPVs) and its subsequent effects on charge carrier kinetics at the electron donor-acceptor interface are investigated.

Control of Phase Separation and Crystallization for High-Efficiency and Mechanically Deformable Organic Solar Cells. Zicheng Ding, Corresponding Author. ... -based ternary blends through film-formation dynamics is an effective strategy toward high-performance stretchable organic photovoltaic films. 2 Results and Discussion 2.1 Materials ...

Organic photovoltaics (OPVs) are a promising power source with greatly potential applications in wearable electronics, ... (Tol), always possess longer drying time for film formation, leading to a severe donor/acceptor phase separation and thus the poor performance of the device. [19] Distinguished to the bulk-heterojunction (BHJ) with ...

The microstructure of the active layer in organic photovoltaics (OPVs), such as the size of phase separation, purity of the phases, and molecular packing within each phase, plays a crucial role in influencing the behavior of excitons and charge carriers within the active layer. It is also a key determinant of the photovoltaic

performance of the ...

Organic photovoltaics (OPVs) have experienced rapid development propelled by the advancement of highly efficient materials and smart device engineering. ... In addition, BTR has strong crystallinity, which can ensure the appropriate crystallinity and phase separation size of the ternary system under the premise of good miscibility, which is ...

Bulk heterojunction (BHJ) structure based organic photovoltaics (OPVs) have recently showed great potential for achieving high power conversion efficiencies (PCEs). An ideal BHJ structure would feature large donor/acceptor interfacial areas for efficient exciton dissociation and gradient distributions with high donor and acceptor concentrations near the anode and ...

Phase separation and domain crystallinity control enable open-air-printable highly efficient and sustainable organic photovoltaics. Jie Lv, Jie Lv. ... Improved phase separation and domain crystallinity positively impact charge transport and extraction in OSCs. This is evidenced by the enhanced charge carrier mobility and reduced lifetime of ...

While the phase separation enabled facile charge extraction for the conventional device, the PC 71 BM rich layer near the anode of the. Experimental. Device fabrication. ... Efficient ternary all small molecule organic photovoltaics with NC 70 BA as third component materials. Dyes and Pigments, Volume 187, 2021, Article 109111. Zhiyong Liu ...

Fig. 3: Examples of organic photovoltaic materials. A photovoltaic cell is a specialized semiconductor diode that converts light into direct current (DC) electricity. Depending on the band gap of the light-absorbing material, photovoltaic cells can also convert low-energy, infrared (IR) or high-energy, ultraviolet (UV) photons into DC electricity. A common characteristic of both the ...

Bulk heterojunction (BHJ) structure based organic photovoltaics (OPVs) have recently showed great potential for achieving high power conversion efficiencies (PCEs). ... Potassium-Presenting Zinc Oxide Surfaces Induce Vertical Phase Separation in Fullerene-Free Organic Photovoltaics Nano Lett. 2020 Jan 8;20(1):715-721. doi: 10.1021/acs.nanolett ...

Processing additive suppresses phase separation in the active layer of organic photovoltaics based on naphthalene diimide Author links open overlay panel Zhenghao Mao a, Thinh P. Le b, Kiarash Vakhshouri b, Roshan Fernando a, Fei Ruan a, Evan Muller a, Enrique D. Gomez b, Geneviève Sauvage a

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