Naphthalene diimide solar cells

Are naphthalene diimide based polymers a cathode interlayer?
A series of naphthalene diimide (NDI) based n-type conjugated polymers with amino-functionalized side groups and backbones were synthesized and used as cathode interlayers(CILs) in polymer and perovskite solar cells.

Are naphthalene diimides a good skeleton for optoelectronic devices?
See all authors Naphthalene diimides (NDI) are widely serving as the skeleton to construct electron transport materials (ETMs) for optoelectronic devices. However, most of the reported NDI-based ETMs suffer from poor interfaces with the perovskite which deteriorates the carrier extraction and device stability.

What are the most promising ETL materials based on naphthalene diimide?
ETL materials,including (6- (1,10-phenanthrolin-3-yl)naphthalen-2-yl)diphenylphosphine oxide (Phen-NaDPO),and n-type materialsbased on the naphthalene diimide (NDI) structure,appear to be amongst the most promising materials to date.

Are naphthalene diimide-based water/alcohol soluble conjugated polymers efficient electron transporting layers?
Toward this goal, we report two novel naphthalene diimide-based, self-doped, n-type water/alcohol-soluble conjugated polymers (WSCPs) that can be processed with a broad thickness range of 5 to 100 nm as efficient electron transporting layers (ETLs) for high-performance PSCs.

What are the properties of naphthalene-diimide semiconducting polymers?
Three naphthalene-diimide semiconducting polymers were synthesized. These polymers showed excellent thermal stability, high crystallinity, and matched energy level to that of perovskites. These polymers were utilized as single electron-transporting layer in inverted perovskite solar cells.

Are naphthalene diimides a conflict of interest?
The authors declare no conflict of interest. Abstract Naphthalene diimides (NDI) are widely serving as the skeleton to construct electron transport materials (ETMs) for optoelectronic devices. However,most of the reported NDI-based ETMs suff...

Designing four naphthalene di-imide based small organic solar cells with 5,6-difluoro-3-oxo-2,3-dihydro-indene non-fullerene acceptors. Published: 29 August 2021; Volume 53, article number 541, (2021) Cite this article; Download PDF. Optical and Quantum Electronics Aims and scope Submit manuscript Designing four naphthalene di-imide based small organic ...

Here, two new CIL materials, NDI-PhC4 and NDI-PhC6 were synthesized by varying the alkylamine chain length on the NDI-Ph core. Our investigation reveals a systematic variation in the physical and chemical

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Polymer solar cells (PSCs) based on non-fullerene acceptors have the advantages of synthetic versatility, strong absorption ability, and high thermal stability. These characteristics result in impressive power conversion efficiency values, but to further push both the performance and the stability of PSCs, the insertion of appropriate interlayers in the device ...

Silicon-organic heterojunction solar cells suffer from a noticeable weakness of inefficient rear contact. To improve this rear contact quality, here, two solution-processed organic n-type donor-acceptor naphthalene diimide (NDI)-based conjugated polymers of N2200 and fluorinated analogue F-N2200 are explored to reduce the contact resistance as well as to ...

A new naphthalene diimide based copolymer with phosphite ester pendants (PFNDI) is developed as an ETL in inverted PSCs. The naphthalene diimide backbone and the ...

Electronically active ionenes were realized by integration of naphthalene diimide into a polymer backbone. These conductive polymers have a low degree of crystalline order, show a great processing advantage to remove energy barriers between organic semiconductors and metal electrodes, and afford fullerene-based, non-fullerene-based, as well as ternary organic ...

Three naphthalene-diimide semiconducting polymers were synthesized. These polymers showed excellent thermal stability, high crystallinity, and matched energy level to that of perovskites. These polymers were utilized as single electron-transporting layer in inverted perovskite solar cells.

An evaluation of three naphthalene diimide (NDI) copolymers as electron acceptors in BHJ solar cells finds that all-polymer solar cells based on an NDI-selenophene copolymer (PNDIS-HD) acceptor and a thiazolothiazole copolyMER (PSEHTT) donor exhibit a record 3.3% power conversion efficiency. Expand

Toward this goal, we report two novel naphthalene diimide-based, self-doped, n-type water/alcohol-soluble conjugated polymers (WSCPs) that can be processed with a broad thickness range of 5 to 100 nm as efficient ...

A series of naphthalene diimide (NDI) based n-type conjugated polymers with amino-functionalized side groups and backbones were synthesized and used as cathode interlayers (CILs) in polymer and perovskite solar cells. Because of controllable amine side groups, all the resulting polymers exhibited distinct electronic

properties such ...

Naphthalene diimide (NDI)-thiophene [[21] ... NDI-BiSe, and NDI-TriSe devices are 9.51%, 7.66% and 14.0%, respectively. The solar cell performance of NDI-TriSe device is comparable to that of standard cell using thermal deposited C 60 /BCP as ETL (PCE of 14.6%) with slightly lower V OC and FF but higher J SC. Further modification of the polymer structure ...

The electron transport layer plays a critical role in the perovskite formation and the interfacial charge dynamics in n-i-p PSCs. To enhance the optoelectronic properties of perovskite buried interfaces, a representative ...

Tin dioxide (SnO 2) is modified by (sulfobetaine-N,N-dimethylamino)propyl naphthalene diimide (NDI-B) and used as an ETL. The NDI-B effectively reduces the interfacial nonradiative recombination between the ETL and perovskite and suppresses the ion migration by passivating oxygen-vacancy defects in SnO 2 and strongly interacting with ...

The electron transport layer plays a critical role in the perovskite formation and the interfacial charge dynamics in n-i-p PSCs. To enhance the optoelectronic properties of perovskite buried interfaces, a representative design concept for developing fluorinated naphthalene diimide-based organic ETMs is proposed.

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