

Organic solar cells can convert a steel roof into an energy-producing device

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In news— An organic solar cells consisting of a combination of an organic polymer and PCBM (an organic semiconductor) developed on steel substrates can potentially convert a steel roof into an energy-producing device with greater efficiency than those currently available in the market.

Key updates-

- The potential of third-generation solar cell technologies lies in their integration with flexible and conformal surfaces.
- However, this integration requires developing new top transparent conducting electrodes as alternatives to indium tin oxide, an optoelectronic material currently in use and poses limitations because of its brittleness and as its optoelectronic efficiency varies with temperature.
- **Researchers at IIT Kanpur have developed organic solar cell devices** consisting of a blend of organic polymer PTB7 as a donor and PCBM as an acceptor.
- The devices were fabricated on opaque steel substrates with a MoO₃/Au/MoO₃ top electrode.
- The research demonstrated the integration of multi-layered electrodes of configuration MoO₃/Au/MoO₃ with the organic solar cells.
- These electrodes offer higher optical transmission as compared to only metallic electrodes.
- The devices with multilayer electrodes showed a clear improvement in the photovoltaic performance by 1.5 times, as compared with those obtained with single-layer

top metal electrodes of gold.

- The materials and device fabrication of perovskite and organic solar cells took place in the Class 10000 clean room facility at IIT Kanpur, which was supported by funding from DST under the DST-RCUK APEX project.
- The facility can carry out the complete fabrication of organic and perovskite solar cells.