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Zhiwen Jin, Jie Yan, Xing Huang, Wei Xu,  
Shiyong Yang, Daoben Zhu, Jizheng Wang



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**Solution-processed transparent coordination polymer electrode for photovoltaic solar cells**

Zhiwen Jin<sup>#</sup>, Jie Yan<sup>#</sup>, Xing Huang, Wei Xu\*, Shiyong Yang, Daoben Zhu, Jizheng Wang\*

<sup>#</sup> These authors contributed equally to this work.

[\*] Dr. Zhiwen Jin, Jie Yan, Xing Huang, Prof. Wei Xu, Prof. Shiyong Yang, Prof. Daoben Zhu, Prof. Jizheng Wang

Beijing National Laboratory for Molecular Sciences

Institute of Chemistry

Chinese Academy of Sciences, Beijing 100190, P.R. China

University of Chinese Academy of Sciences, Beijing 100049, P.R. China

E-mail: wxu@iccas.ac.cn, jizheng@iccas.ac.cn

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**Abstract:**

Currently, photovoltaic research area is short of solution-processed transparent electrodes, which can replace the widely used vacuum-deposited indium tin oxide (ITO). Here, by employing a two-dimensional metal-organic framework (2D-MOF) Cu-BHT (BHT = benzenehexathiol), a solution-processed transparent electrode with high conductivity over  $2500 \text{ Scm}^{-1}$  and high transmittance of 82% is developed. Three classic photovoltaic solar cells (perovskite solar cells, quantum dots solar cells and organic solar cells) are fabricated on both glass and flexible polyimide (PI) substrates with this Cu-BHT electrode, replacing conventionally used ITO. The performances of all the devices are comparable to their corresponding ones with ITO electrode, indicating the great potential of the Cu-BHT electrode in future low-cost and flexible optoelectronics.

**1. Introduction**

Transparent electrodes are key components of next-generation electronics, especially for photovoltaic solar cells.<sup>1-4</sup> Various types of conducting films with relatively high optical transparency and mechanical flexibility, such as carbon nanotubes,<sup>5-7</sup> silver nanowires,<sup>8-10</sup> conducting polymers,<sup>11-13</sup> graphene<sup>14-16</sup> and hybrids of the above<sup>17-19</sup> have been explored for

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