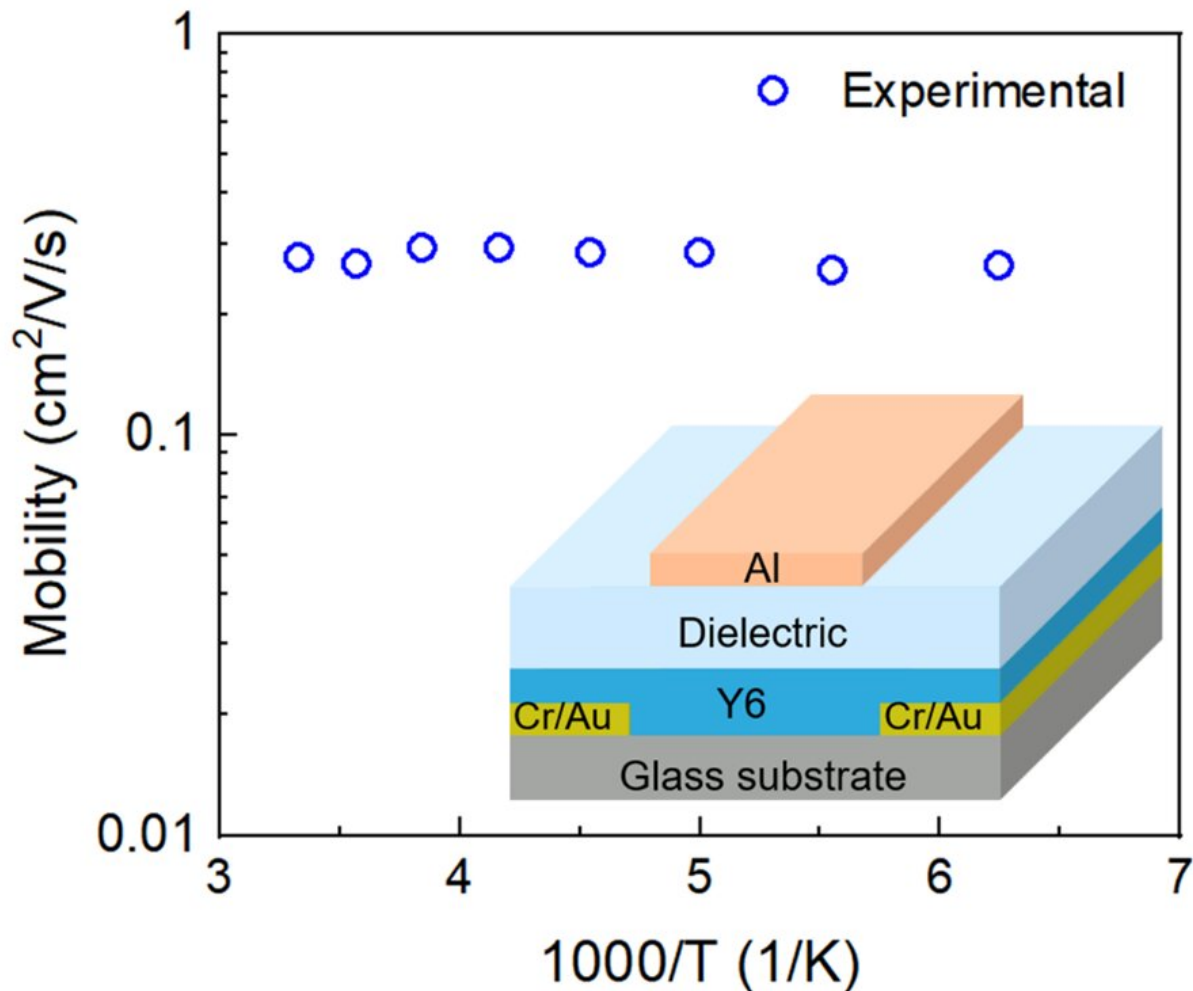


# Organic TFTs exhibiting band-like transport

July 14 2022



Dependence of mobility as a function of temperature in Y6 OTFTs indicating band-like transport. Credit: Kaixuan Chen et al, *Frontiers of Optoelectronics* (2022). DOI: 10.1007/s12200-022-00019-2

Organic thin-film transistors (OTFTs) are the basic building blocks for flexible and stretchable electronics. As organic semiconductor films usually contain significant structural and energetic disorder, charge carriers hop between localized states for charge transport, and thus the mobility of OTFTs generally shows thermally activated behavior, i.e., the mobility increases with increasing temperature. The increase of mobility with decreasing temperature, which is the so-called band-like transport, has been reported in single-crystal organic transistors but rarely been reported in OTFTs by far.

Researchers led by Prof. Yuanyuan Hu at Hunan University, China, investigated the charge [transport](#) properties of OTFTs based on Y6, which is a famous non-fullerene acceptor (NFA) that has resulted in dramatic enhancement of power conversion efficiency of organic solar cells. Interestingly, they observed the slightly increase of mobility with lowered temperatures, namely the band-like transport in such devices. By carefully inspecting the film morphologies, they revealed that the band-like transport originates from the unique molecule packing motif of Y6 and the special phase of the film. Their work not only demonstrates the superior [charge transport](#) property of Y6, but also suggests the great potential of developing high-mobility n-type organic semiconductors and TFTs on the basis of Y6.

The work entitled "Band-like transport in non-fullerene acceptor semiconductor Y6" was recently published in *Frontiers of Optoelectronics* (May 26, 2022).

**More information:** Kaixuan Chen et al, Band-like transport in non-fullerene acceptor semiconductor Y6, *Frontiers of Optoelectronics* (2022). [DOI: 10.1007/s12200-022-00019-2](https://doi.org/10.1007/s12200-022-00019-2)

Provided by Higher Education Press

Citation: Organic TFTs exhibiting band-like transport (2022, July 14) retrieved 22 July 2024  
from <https://phys.org/news/2022-07-tfts-band-like.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.