

ESR分光を用いた有機系太陽電池における電荷状態の直接観測と素子特性との相関の解明

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研究の目的

For ideal solar cell, no charge accumulation should occur. One photon creates hole and electron, which are collected by electrodes.

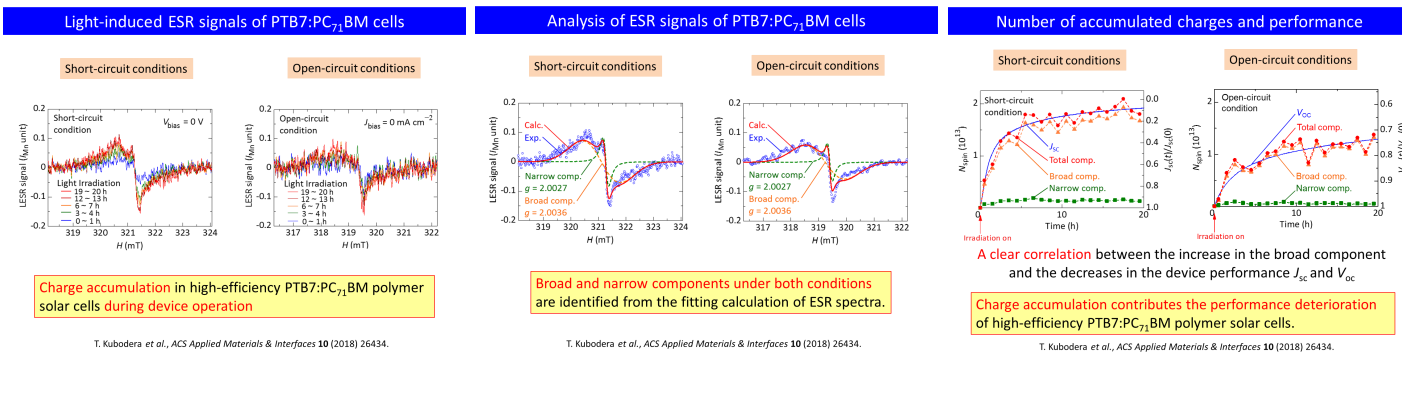
However, in actual solar cells, what happens?
...Charges accumulation occurs.

Microscopic analysis of organic-based solar cells
by detecting charge accumulation during device operation
The sites can be clarified by a unique ESR parameter g factor for the material.

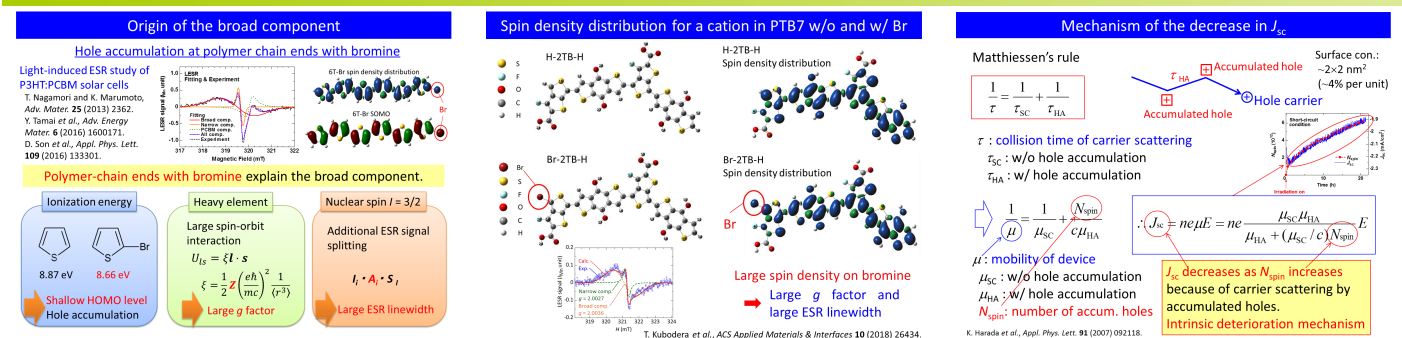
実験

Simultaneous measurements of ESR and device performance

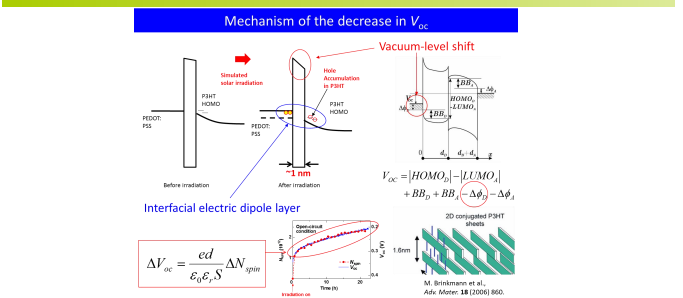
結果



考察



考察



結論

Microscopic investigation into charge states in organic-based solar cells

ESR study of PTB7:PC₇₁BM solar cells

- Hole accumulation at PTB7 chain ends with bromine
- Correlation with performance deterioration

ESR study of perovskite solar cells

- Correlation between hole accumulation in spiro-OMeTAD and device performance
- Hole accumulation in the cell varies the device performance.
- Intrinsic device operation mechanism

ESR analysis:
Useful knowledge for understanding of device operation and improvement of device performance at the molecular level