

# Electrochromism of Metallo-Supramolecular Polymer

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## Background

- Nonvolatile displays don't need continuous power supply
- Smart window will contribute to energy-saving of air-conditioner in car and office
- We found excellent electrochromic properties of metallo-supramolecular polymer

## Aim

- Synthesis of metallo-supramolecular polymers with unique electrochromic property
- Electrochemical devices fabrication using the electrochromic polymer
- Application for electrochromic smart window and the other products

## Advanced Research Topics

Metallo-supramolecular polymer is synthesized by complexation of metal ions and organic ligands (Fig. 1). We found electrochromism of the polymer by the control of the metal-to-ligand charge transfer through electrochemical redox of metal ions (Fig. 2).

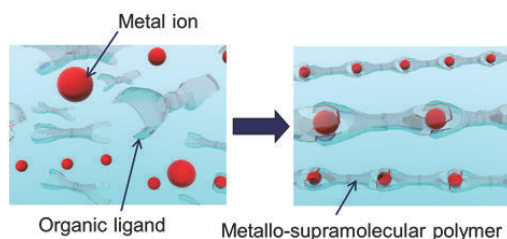


Fig. 1. Metallo-supramolecular polymer.

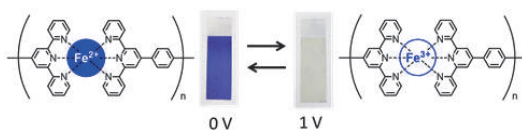


Fig. 2. Electrochromic property.

We succeeded in fabricating nonvolatile smart window by utilizing the electrochromic properties of metallo-supramolecular polymer. Colorless and colored states of the device and the device structure are shown in Fig. 3.

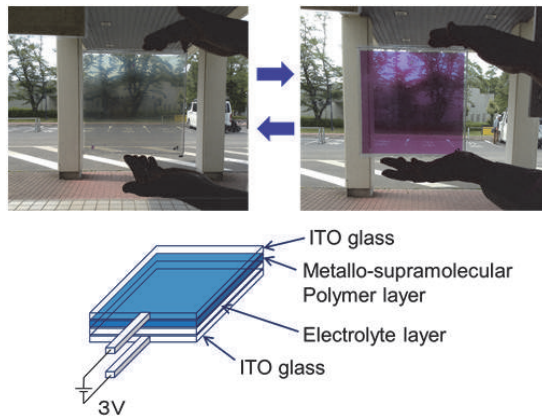


Fig. 3. Smart window with metallo-supramolecular polymer and the device structure.

## Publications

- M. K. Bera, M Higuchi *et al.*, *Macromol. Rapid Commun.*, (2018) in press.
- M. Eguchi, M. Higuchi *et al.*, *ACS Appl. Mater. Interfaces*, **9**, 35498–35503 (2017).
- C. Chakraborty, U. Rana, R. K. Pandey, S. Moriyama, M. Higuchi, *ACS Appl. Mater. Interfaces*, **9**, 13406–13414 (2017).

## Applied area and future prospects

- Smart window
- Digital signage and electronic price tag
- Wearable nonvolatile display

## Issues for technology transfer

- Durability of devices to repetition and heat
- Cheaper production cost
- Establishment of mass production process