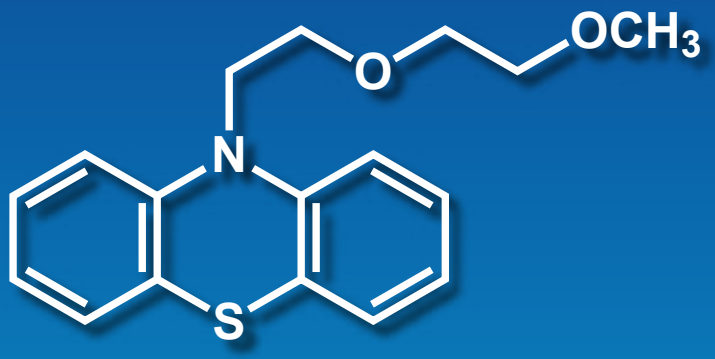
MATERIALS

非水系レドックスフロー電池材料
MEEPT

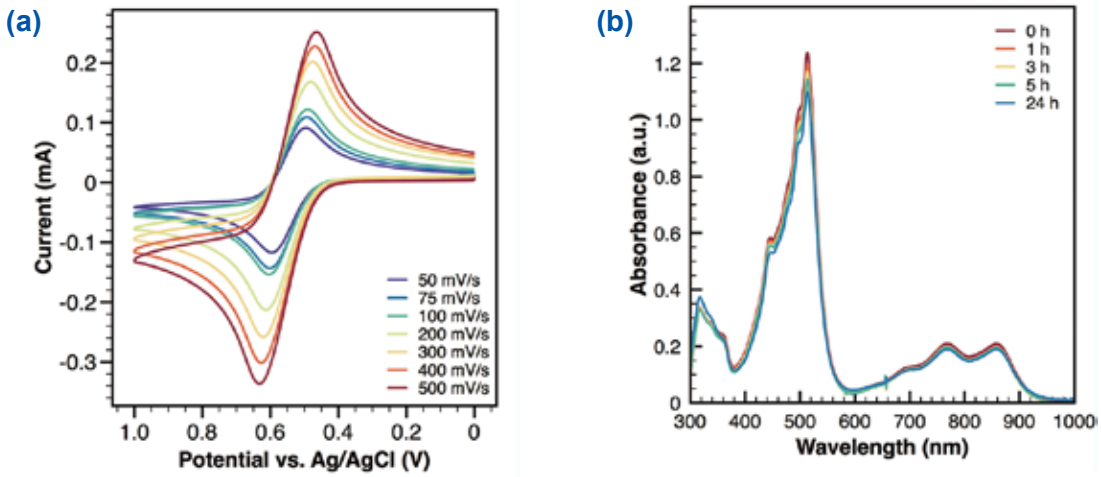


MEEPT
10g
[M3068]

特長

- 非水系レドックスフロー電池（RFB）の正極材料
- 高い電流密度
- 長いサイクル寿命
- 非水有機溶媒や電解液に混和
- 酸化電位：0.31 V (vs Fc/Fc^+) in TEA-BF_4 MeCN溶液; 3.60 V (vs. Li/Li^+) in $LiPF_6$-EC/EMC

MEEPT/MEEPT$^+$の電気化学的および分光学的性質



(a) Cyclic voltammogram of MEEPT at 10 mM in 0.1 M $TBAPF_6$ in DCM recorded at scan rates from 10 to 500 mV/s
(b) UV-vis spectra of MEEPT-$SbCl_6$ at 0.15 mM in acetonitrile for up to 24 hours after dissolution

These graphical materials were provided by Prof. Odom.

引用文献　J. D. Milshtein, A. P. Kaur, M. D. Casselman, J. A. Kowalski, S. Modekrutti, P. L. Zhang, N. H. Attanayake, C. F. Elliott, S. R. Parkin, C. Risko, F. R. Brushett, S. A. Odom, *Energy Environ. Sci.* **2016**, *9*, 3531. https://doi.org/10.1039/C6EE02027E

本製品はSusan Odom教授の技術指導により製品化されました。

研究室のご紹介

Odom研究室 - ケンタッキー大学

Professor Susan A. Odom

Research in the Odom group focuses on the design and synthesis of stable electro-active organic compounds for use in applications requiring reversible electron-transfer reactions, which is enabled through increased stability of their oxidized or reduced forms.

Stable electro-active organic compounds have been utilized in a variety of applications in organic electronics, photovoltaics, and catalysis. An area of particular interest is identifying materials with characteristics amenable for use in non-aqueous redox flow batteries (RFBs). Materials for this application must be highly soluble and highly stable in a battery environment and - for practical use – must be scalable and low cost. We have focused the functionalization of heterocyclic fused-ring compounds such as building blocks and have developed stable materials with extensive performance at high concentration cycling experiments in non-aqueous environments.

Developing Stable Electron Donors

The Odom research group focuses on the design, synthesis, and characterization of electroactive materials in various states of oxidation or reduction, with a main goal of identifying characteristics in molecular structure that lead to more robust materials. We generate radical cations and anions through redox reactions with chemical reagents and through bulk electrolysis, then analyze the stability using UV-vis and EPR spectroscopy, and utilize NMR and mass spectrometry to determine decomposition products.[1),2),3)] Through this combination of techniques, we have designed more stable materials. In some cases, the radical cation salts of phenothiazine derivatives have been sufficiently stable to allow for isolation of X-ray quality single crystals.

Relevant Publications

1) A Fast, Inexpensive Method for Predicting Overcharge Performance in Lithium-Ion Batteries
S.A. Odom, S. Ergun, P.P. Poudel, S.R. Parkin, *Energy Environ. Sci.* **2014**, *7*, 760.
2) *N*-Substituted Phenothiazine Derivatives: How Stability of the Neutral and Radical Cation Forms Affects Overcharge Performance in Lithium-Ion Batteries (cover article)
K.A. Narayana, M.D. Casselman, C.F. Elliott, S. Ergun, C. Risko, S.A. Odom, *ChemPhysChem* **2015**, *16*, 1179.
3) The Fate of Phenothiazine-Based Redox Shuttles in Lithium-Ion Batteries
M.D. Casselman, A.P. Kaur, K.A. Narayana, C.F. Elliott, C. Risko, S.A. Odom, *Phys. Chem. Chem. Phys.* **2015**, *17*, 6905.

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