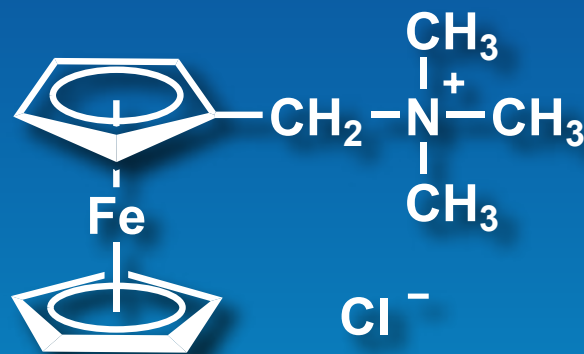


# 中性pHで駆動可能な 水系レドックスフロー電池材料 FcNCl



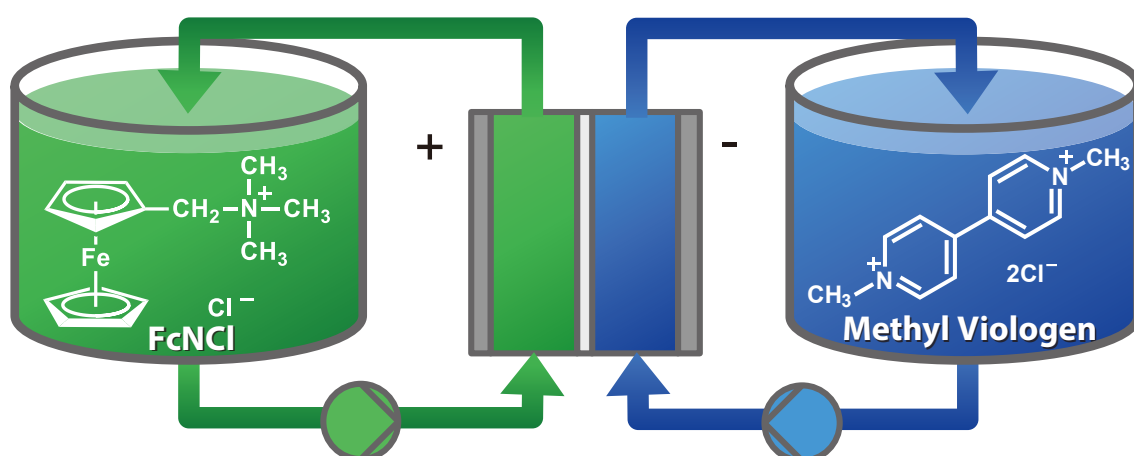
FcNCl  
1g / 5g  
[F1231]

## 特長

- ・ 高い溶解度 (4.0M in water, 3.0M in 2.0M NaCl)
- ・ 高い理論エネルギー密度 (45.5 Wh/L)
- ・ 高いサイクル安定性 (99.99% per cycle at 0.5M)
- ・ 中性pHで駆動可能

## 利用例

### 水系レドックスフロー電池の電解質として



引用文献 B. Hu, C. DeBruler, Z. Rhodes, T. L. Liu, *J. Am. Chem. Soc.* **2017**, 139, 1207.  
<https://doi.org/10.1021/jacs.6b10984>

本製品は、Tianbiao L. Liu 先生の指導により製品化されました。

## 関連製品

Methyl Viologen  
BTMAP-Fc  
BTMAP-Vi Dihydrate

1g / 5g [D3685]  
5g [B5660]  
5g [B5659]

# 中性pHで駆動可能な水系レドックスフロー電池材料 FcNCI

## 研究室のご紹介

## Tianbiao (Leo) Liu研究室 - ユタ州立大学

Professor Tianbiao (Leo) Liu received his Bachelor's degree in Biochemistry from Hubei University of Technology in Wuhan in 2000. In 2004, Leo obtained his Master's degree in Chemistry under the joint supervision of Professor Licheng Sun and Professor Mei Wang at Dalian University of Technology, where he conducted research on organic and organometallic synthesis on Ru based photosensitizers and FeS clusters.

In 2005, Leo joined Professor Marcetta Darensbourg's group at Texas A&M for his PhD studies on organometallic complexes modeling natural [NiFe], [FeFe] and [mono-Fe] hydrogenases, which was supported by the Welch Foundation Predoctoral Fellowship. Leo synthesized the first mix-valent Fe(II)Fe(I) model of the [FeFe] hydrogenase active site, a long standing synthesis challenge in the biomimetic field of hydrogenases. In his PhD studies, Leo also developed broad interests in X-ray single crystal diffraction, electrochemistry, and DFT calculations.

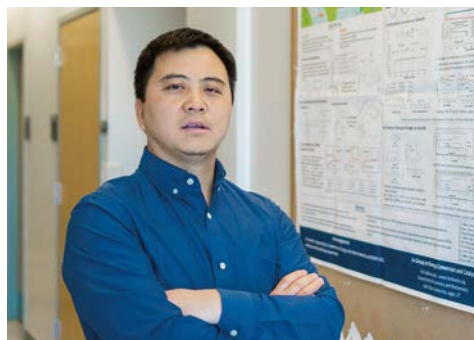
Shortly after receiving his PhD degree in the fall of 2009, Leo became a postdoctoral scholar at the Center for Molecular Electrocatalysis (CME) at the Pacific Northwest National Laboratory led by Dr. Daniel DuBois and Dr. R. Morris Bullock. At the CME, Leo developed the first well-defined, Fe-based molecular catalysts for the oxidation of hydrogen, and he also developed other organometallic electrocatalysts for O<sub>2</sub> reduction and CO<sub>2</sub> reduction. In 2013, he was promoted to staff scientist in the Division of Energy and Material Process at Pacific Northwest National Labs. As PIs, Leo led thrusts on developing cost-effective and high energy density Mg-ion and Li-ion energy storage systems supported by several DOE programs.

In January, 2015, he joined the Department of Chemistry and Biochemistry at Utah State University (USU). The Liu Research Group at USU focuses on electrochemical energy storage, electrocatalysis, and homogenous catalysis employing earth abundant element based catalysts and materials. His group strives to achieve sustainable, economical, and environmentally-benign energy and chemical transformations that address the global energy and environment challenges simultaneously. Pioneering the development of pH neutral aqueous redox flow batteries (AORFBs) employing water soluble viologen, ferrocene, TEMPO, and other molecules. His group develops stable organic flow batteries and that are highly attractive for sustainable and low-cost storage of renewable energy. Additionally, his group continues to make important contributions to the development of electrolyte chemistry for Mg batteries and electrocatalytic approaches for CO<sub>2</sub> reduction and N<sub>2</sub> fixing. His independent research career has been recognized by several honors including the 2018 Chemical Communications Emerging Investigator selected by the Royal Chemical Society, 2017/2018 Scialog Fellow on Advanced Energy Storage selected by Research Corporation on Science Advancement, 2017 Utah Energy Research Triangle Faculty Award, and Co-recipient of the 2015 ACS Catalysis Lectureship for the Advancement of Catalytic Science selected by the American Chemical Society.

Learn more about the Liu Research Group.

Website: <https://www.tianbiaoliu.org>

Recent publications: <https://www.tianbiaoliu.org/publications.html>



Tianbiao (Leo) Liu博士  
Utah State University

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