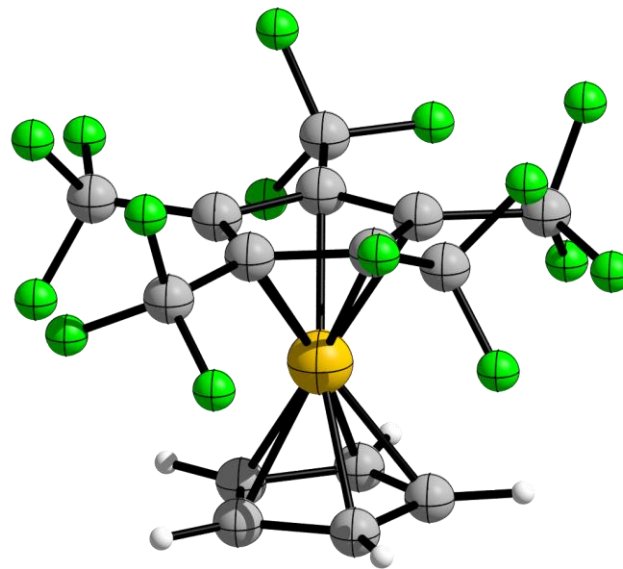


When Organometallic and Fluorine Chemistry meet...



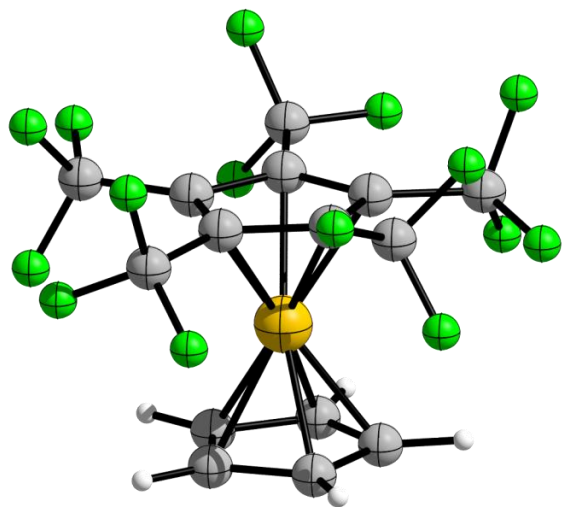
Dr. Moritz Malischewski

15.11.2024

Overview

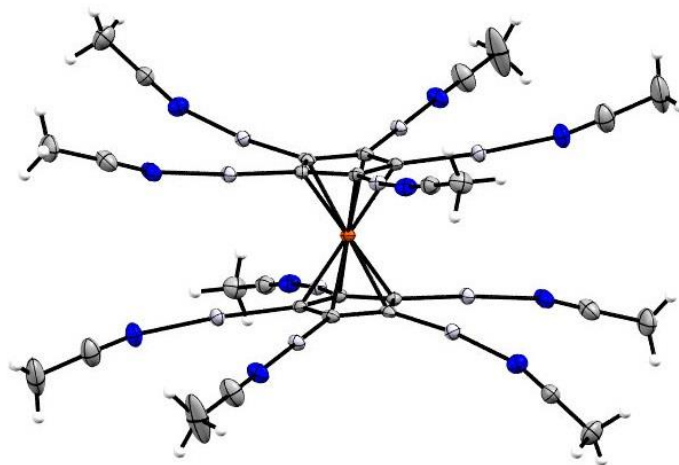


Perfluorinated Cp* Ligand



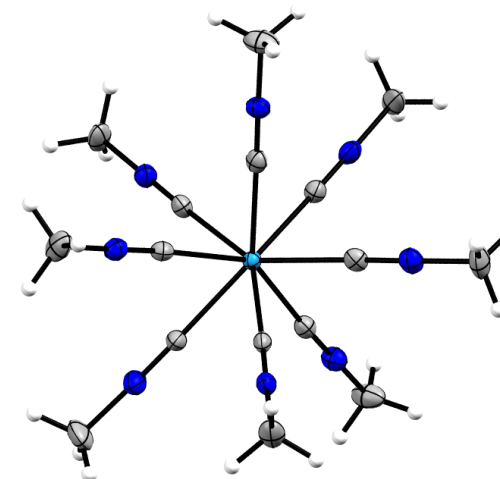
Synlett **2023**, 34, 1079.
Angew. Chem. Int. Ed. **2022**, 61, e202211147.
Dalton Trans. **2023**, 52, 5496.
Chem. Eur. J. **2024**, 30, e202400427.
Chem. Sci. **2024**, 15, 2990.

Challenging Metallocene Hg-Chemistry



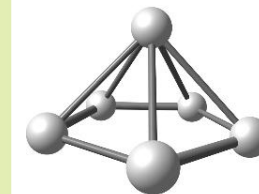
Chem. Eur. J. **2021**, 27, 5125.
Organometallics **2022**, 41, 1261.
Dalton Trans. **2023**, 52, 6870.
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Cyanide Chemistry



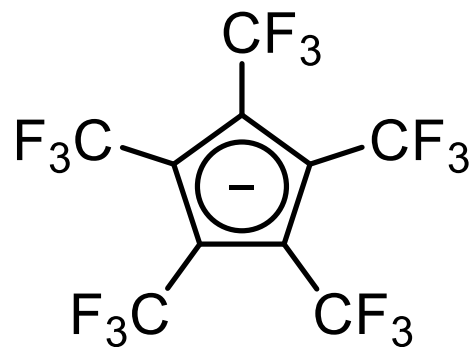
Angew. Chem. Int. Ed. **2019**, 59, 10519.
Cryst. Growth Des. **2020**, 20, 7104.
Inorg. Chem. **2021**, 60, 5917.
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Chem. Commun. **2022**, 58, 4958.
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CrystEngComm, **2024**, 26, 594.
CrystEngComm, **2024**, 26, 3627.

Overview $[\text{C}_5(\text{CF}_3)_5]^-$



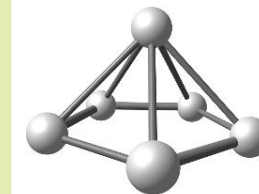
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- Accessible in gram scale
- Reduced π -donor properties \rightarrow weaker bound



Robin Sievers, PhD student

Organometallic Chemistry in High Oxidation States



AG Malischewski

- Target: first organometallic compound in oxidation state +VIII
- → Osmium chemistry
- Usage of strong donor ligands:
- Nitrido N^{3-} , Imido RN^{2-} , Oxido O^{2-} , N-heterocyclic carbenes
- Using powerful oxidation agents






Joshua Parche, PhD student

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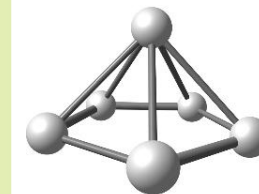
The synthesis and characterization of an iron(VII) nitrido complex

[Martin Keilwerth](#), [Weiqing Mao](#), [Moritz Malischewski](#), [Sergio A. V. Jannuzzi](#), [Kevin Breitwieser](#), [Frank W. Heinemann](#), [Andreas Scheurer](#), [Serena DeBeer](#) , [Dominik Munz](#) , [Eckhard Bill](#) & [Karsten Meyer](#) 

[Nature Chemistry](#) **16**, 514–520 (2024) | [Cite this article](#)

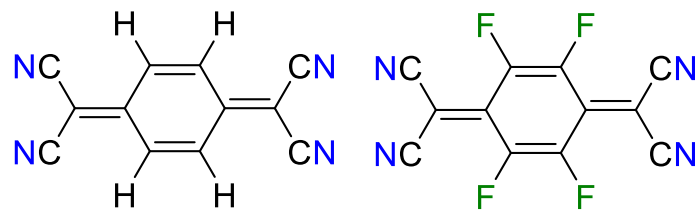
16k Accesses | **9** Citations | **107** Altmetric | [Metrics](#)

Organic Electron acceptors

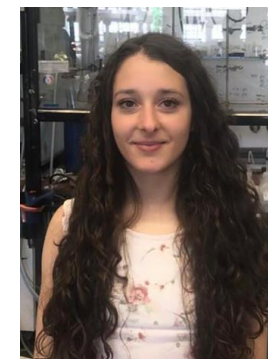
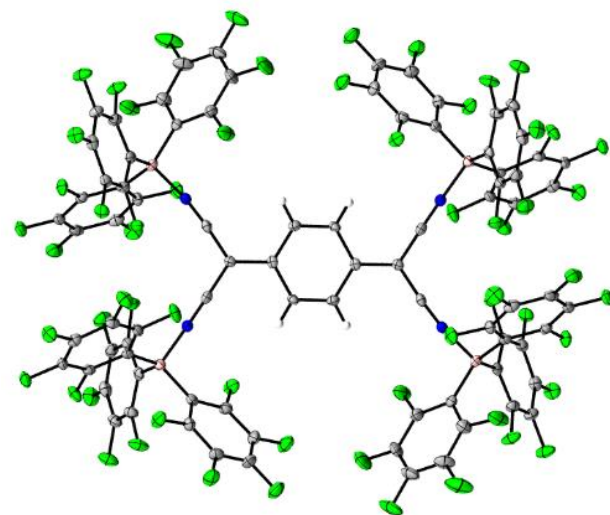


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- Organic electron acceptors as TCNQ or TCNQF₄ mild oxidants

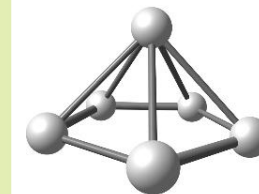


- Used for polymer doping
- Oxidation power significantly increased when combined with Lewis acids as B(C₆F₅)₃
- Investigation of other polynitriles
- Synthesis of new Lewis acids, e.g. B(C₆F₄Br)₃



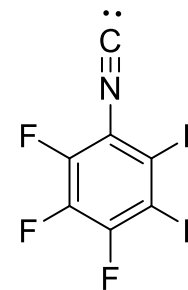
Amina Moshtaha,
PhD student

Polycyanometalates and Metal-Isonitrile Complexes

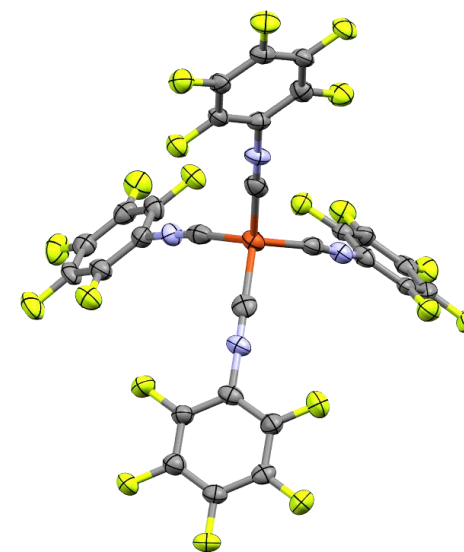
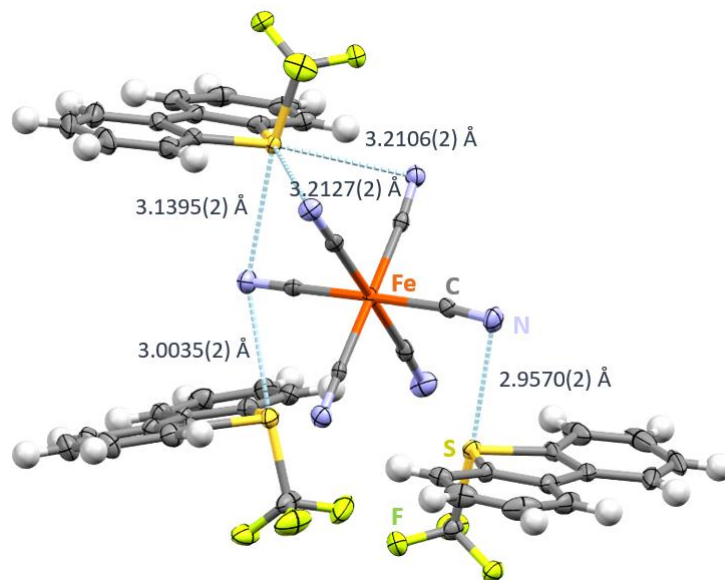
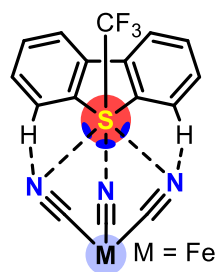
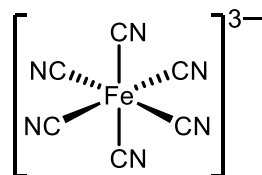


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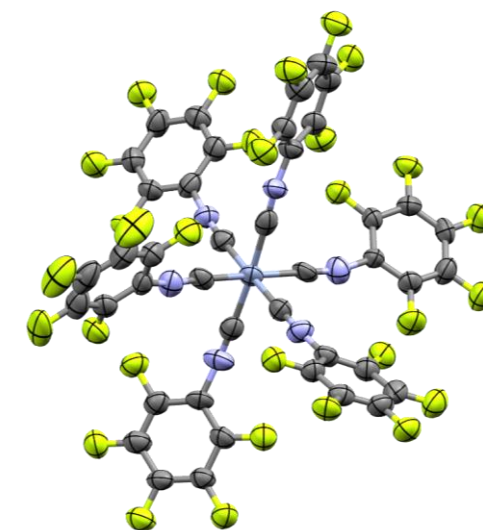
- Reactivity of $[M(CN)_x]^{n-}$ complexes with electrophiles (superacids, alkylating agents)
- Cyanometalates as building blocks in crystal engineering
- Metal-isonitrile complexes $[M(CNC_6F_5)_x]$ → photochemistry
- Construction of NHC-ligands with fluorinated substituents



Tim Streit, PhD student

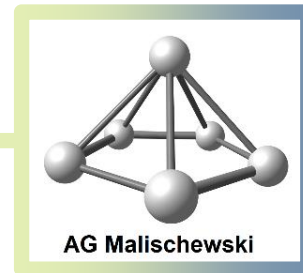


$[Cu(CNC_6F_5)_4]^+[Al(OR^F)_4]^-$



$[Cr(CNC_6F_5)_6]^-$

Overview



- Currently: 4 PhD students
- No long-term perspective
- Not really any vacancies, however you can always ask via e-mail: moritz.malischewski@fu-berlin.de

- Experimental Work:
 - typically air-/moisture sensitive compounds → Schlenk technique/Glovebox
 - NMR/IR-spectroscopy and single crystal X-ray diffraction
 - ≈40 hours/week

- Knowledge in organometallic chemistry (M.Sc.) very helpful