

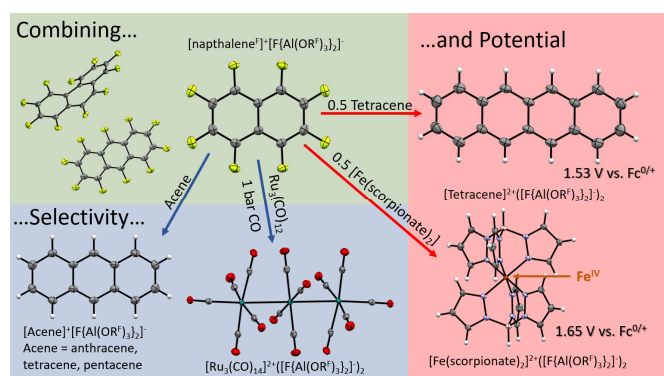
THE ART OF SELECTIVELY REMOVING ELECTRONS FROM ORGANIC MOLECULES AND METAL COMPLEXES IN CONDENSED PHASE

Malte Sellin, Ingo Crossing

Albert-Ludwigs-Universität Freiburg, Institut für Anorganische und Analytische Chemie, 79104 Freiburg, malte.sellin@ac.uni-freiburg.de

The removal of an electron from a molecule (one-electron oxidation/ deelectronation) is one of the most fundamental chemical reactions at all. This reaction however leads in the most cases to reactive radical-cations, which are often difficult to handle in condensed phase. The handling not only requires both sufficiently weakly coordinating anions (e.g. perfluorinated alkoxyaluminates) and solvents (e.g. fluorinated benzenes), but also the right reagents for removing the electron.

Typical inorganic oxidants e.g. Ag^+ and $[\text{NO}]^+$ often tend to react in unwanted side-reactions instead of a deelectronation with challenging substrates. Perfluorinated arenes such as naphthalene^F, anthracene^F and phenanthrene^F can be reversibly deelectronated and isolated as $[\text{F}\{\text{Al}(\text{OR}^{\text{F}})_3\}_2]^-$ ($\text{OR}^{\text{F}} = \text{OC}(\text{CF}_3)_3$) salts. These innocent deelectronators distribute the radical-cationic charge over a large π -system and prevent with that side reactions, while having very strong redox potentials up to ca. 1.9 V vs. $\text{Fc}^{+/0}$. Both the selectivity and the potential of the perfluoroarenium radical-cations have been proven by reaction with arenes, metal carbonyls and other transition metal complexes.^[1]



[1] a.) M. Sellin, C. Friedmann, M. Mayländer, S. Richert, I. Crossing *Chem Sci.*, 2022, **13**, 9147-9158

b.) M. Sellin, M. Seiler, M. Mayländer, K. Kloiber, V. Radke, S. Richert, S. Weber, I. Crossing *Chem Sci.*, 2023, in peer review.

c.) M. Sellin, M. Seiler, I. Crossing *manuscript in preparation*.