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Frontier Actinide Radiation Chemistry

June 2022

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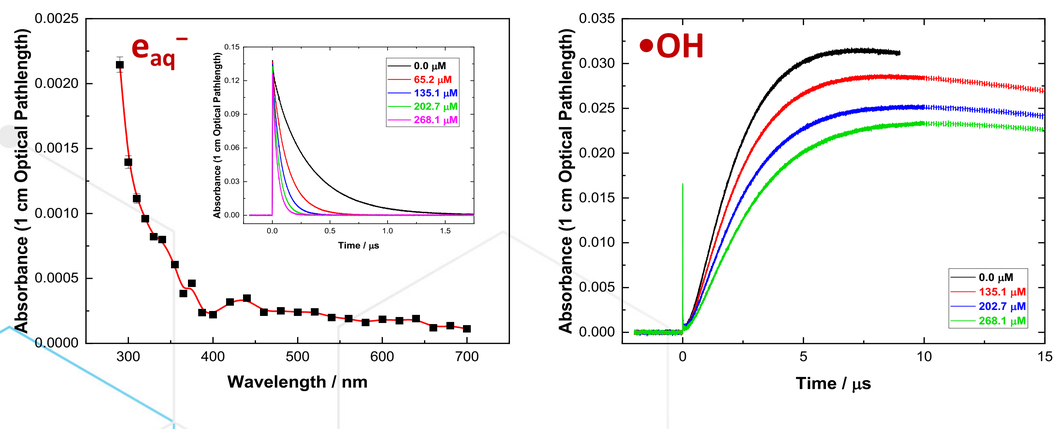
Radiation-Induced Redox Chemistry

- The actinide series marks the point in the periodic table where nuclear instability and the effects of relativity define the basic characteristics of these elements.
- Despite the inherency and significant impact of radiation-induced redox reactions, fundamental knowledge of actinide radiation chemistry is limited.
- The presented time-resolved electron pulse radiolysis data highlight the existence of rich, complex, intrinsic actinide radiation chemistry with redox-active species from the radiolysis of water (e_{aq}^- and •OH) and *n*-dodecane ($RH^{\bullet+}$).

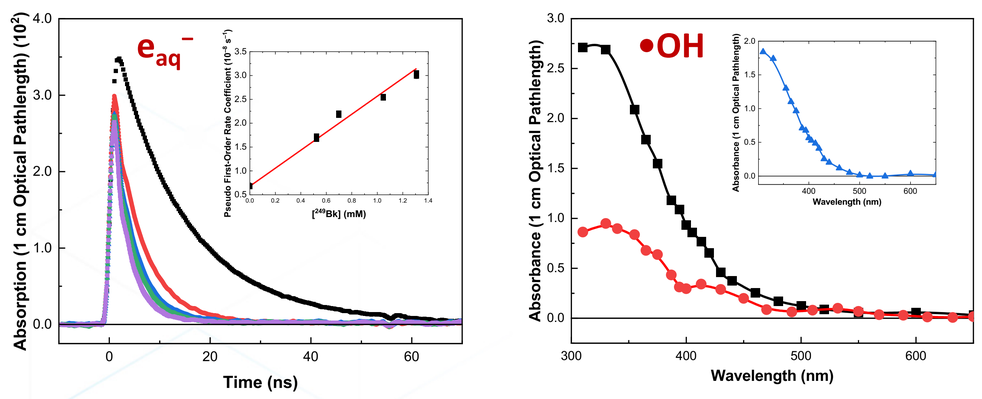
Curium-248

Horne, Grimes, Zalupski, Meeker, Albrecht-Schönzart, Cook, and Mezyk, *Dalton Transactions*, **2021**, *50*, 10853.



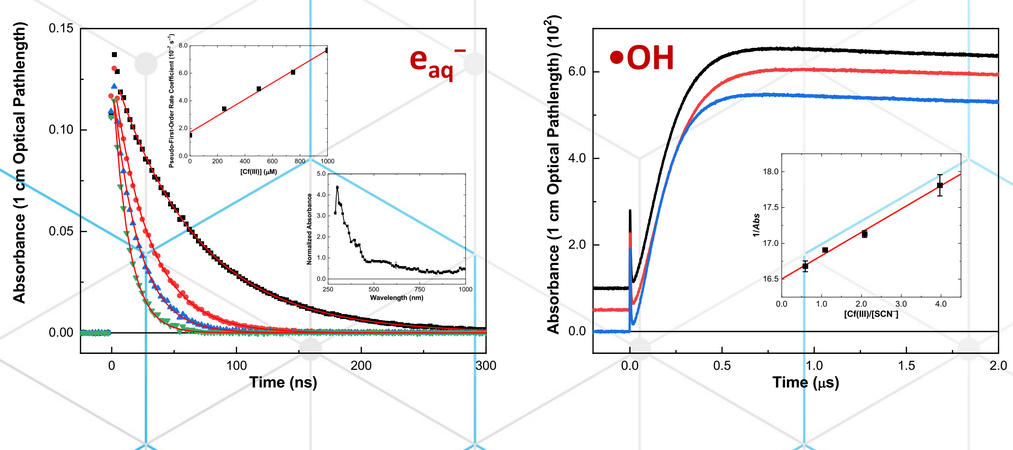
Berkelium-249

Horne, Rotermund, Grimes, Sperling, Meeker, Zalupski, Beck, Gomez Martinez, Beshay, Peterman, Layne, Cook, Albrecht-Schönzart, and Mezyk, *Inorganic Chemistry*, **2022**, *in peer review*.



Californium-249

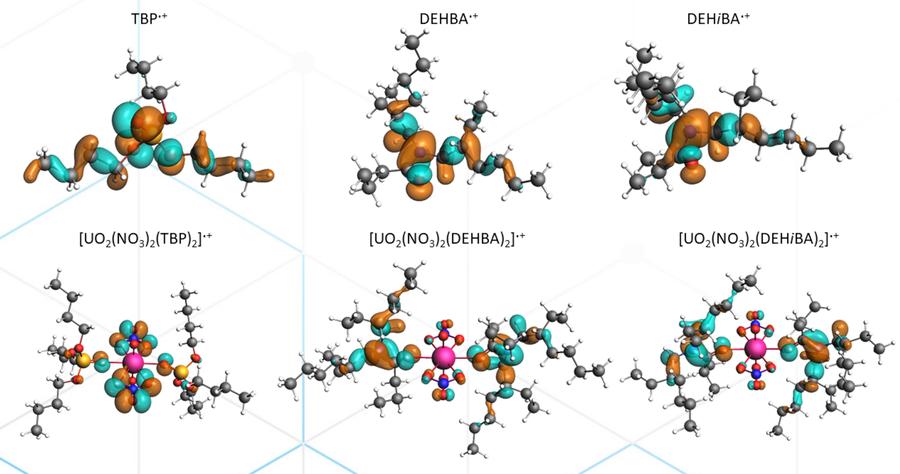
Horne, Rotermund, Grimes, Sperling, Meeker, Zalupski, Beck, Gomez Martinez, Beshay, Peterman, Layne, Cook, Albrecht-Schönzart, and Mezyk, *Inorganic Chemistry*, **2022**, *in peer review*.



Effects of Uranyl Complexation

Celis-Barros, Pilgrim, Cook, Grimes, Mezyk, and Horne, *Physical Chemistry Chemical Physics*, **2021**, *23*, 24589.

$RH \rightsquigarrow e^-, RH^{\bullet+}, RH^{\bullet}, {}^{\bullet}CH_3, H^{\bullet}, H_2$



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