

## Contribution Slides for External IAEA Conference Radiation Chemistry Review

April 2021

Gregory P Horne





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# Contribution Slides for External IAEA Conference Radiation Chemistry Review

**Gregory P Horne** 

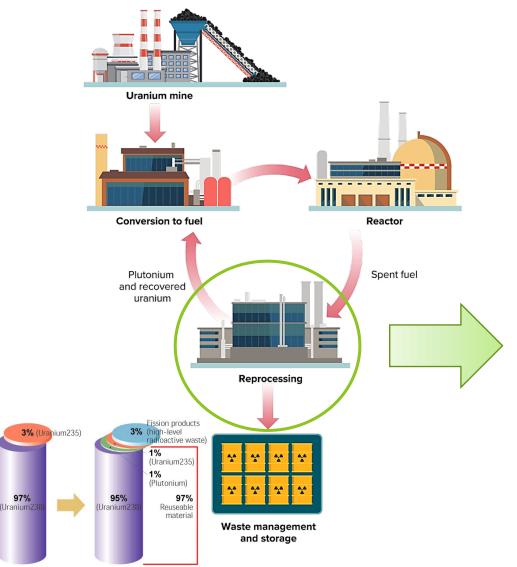
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http://www.inl.gov

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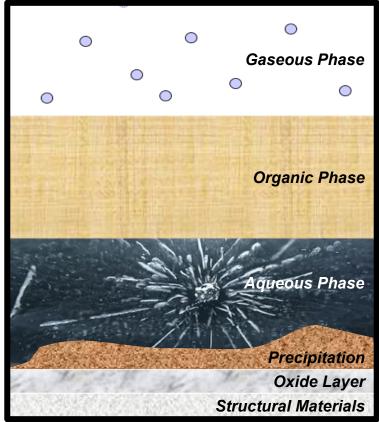
## **Nuclear Fuel Reprocessing and Radiation Chemistry**



Uranium fuel

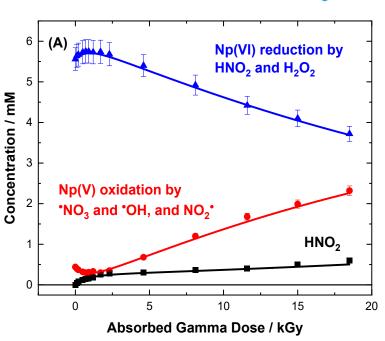
Spent fuel

Solvent Extraction Reprocessing Ligands/organic diluent: HNO<sub>3</sub>/H<sub>2</sub>O

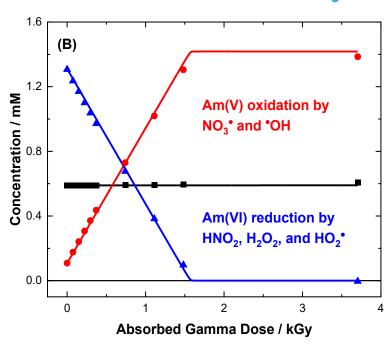


### **Radiation-Induced Actinide Redox Chemistry**

#### 6 mM Np in 4.0 M HNO<sub>3</sub>



#### 2 mM Am in 3.0 M HNO<sub>3</sub>

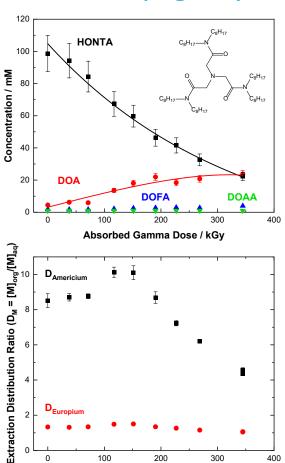


G.P. Horne, T.S. Grimes, B.J. Mincher, and S.P. Mezyk, Journal of Physical Chemistry B, 2016, 120 (49), 12643.

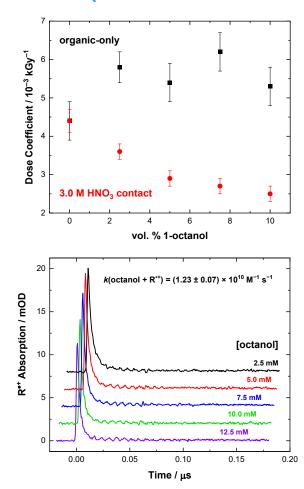
T.S. Grimes, G.P. Horne, C.J. Dares, S.M. Pimblott, S.P. Mezyk, and B.J. Mincher, Inorganic Chemistry, 2017, 56 (14), 8295.

## Radiolysis of Reprocessing Ligands and Additives

#### **HONTA** (Ligand)



#### **Octanol (3rd Phase Modifier)**



T. Toigawa, D.R. Peterman, D.S. Meeker, T.S. Grimes, P.R. Zalupski, S.P. Mezyk, A.R. Cook, S. Yamashita, Y. Kumagai, T. Matsumura, and G.P. Horne, Physical Chemistry Chemical Physics, 2021, 23, 1343.

Absorbed Gamma Dose / kGy

G.P. Horne, C.A. Zarzana, C. Rae, A.R. Cook, S.P. Mezyk, P.R. Zalupski, A. Wilden, and B.J. Mincher, *Physical Chemistry Chemical Physics*, 2020, 22, 24978.