

Electronic Supplementary Information (ESI)

for

Radiolytic degradation of selective actinide extractants from bis-1,2,4-triazine family in cyclohexanone solutions

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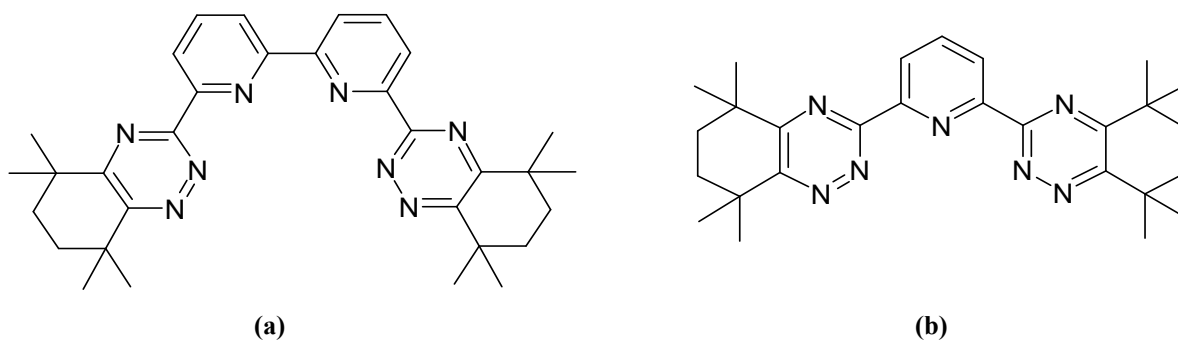


Figure S1. Structural formulas of the investigated extracting ligands: (a) 6,6'-bis(5,5,8,8-tetramethyl-5,6,7,8-tetrahydro-benzo-[1,2,4]-triazin-3-yl)-[2,2'] bipyridine (CyMe₄-BTBP), (b) 2,6-bis(5,5,8,8-tetramethyl-5,6,7,8-tetrahydro-benzo-[1,2,4]triazin-3-yl)pyridine (CyMe₄-BTP).

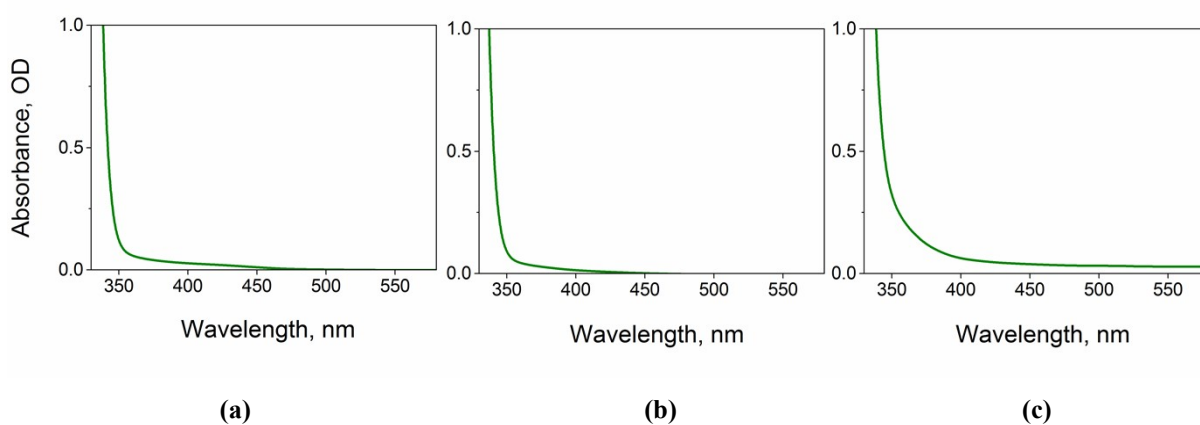


Figure S2. Stationary UV-VIS absorption spectra of cyclohexanone: (a) pure, (b) pre-equilibrated with water, (c) pre-equilibrated with 1M HNO₃. The samples were not saturated with inert gas - they remained in equilibrium with air.

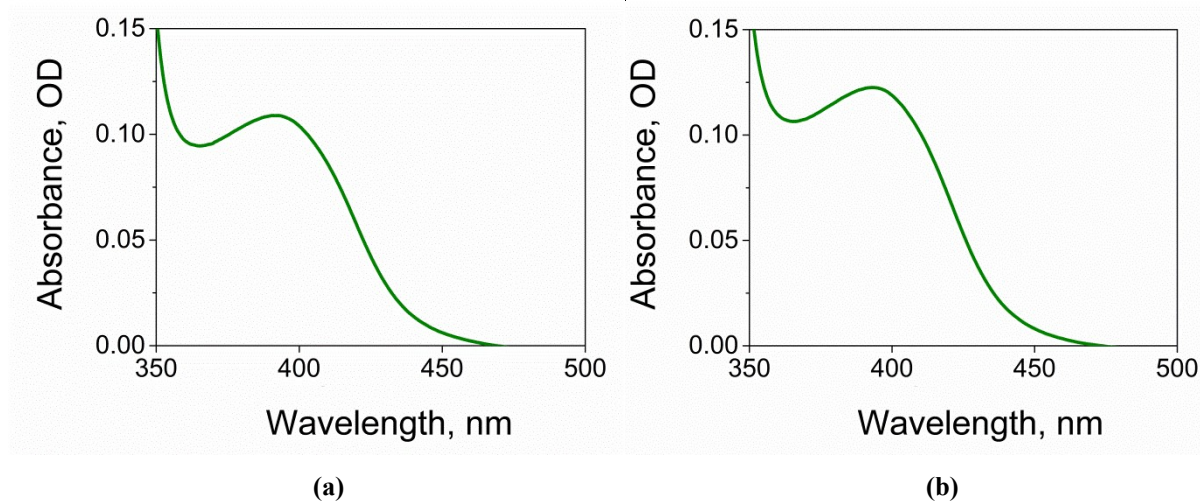


Figure S3. Stationary UV-VIS absorption spectra of solutions containing 0.1 mM of ligands in cyclohexanone: (a) CyMe₄-BTP, (b) CyMe₄-BTBP. The samples were not saturated with inert gas - they remained in equilibrium with air.

Table ST1. Properties of the transient species derived from cyclohexanone during its radiolysis.

Transient species from cyclohexanone	Properties	Reference
triplet states of cyclohexanone $^3(\text{c-Hex})$	absorption band with λ_{max} at 280-320 nm, low intensity	J.C. Dalton, N.J. Turro, Annual Review of Physical Chemistry, 1970, 21, 499-560
anion radicals of cyclohexanone $(\text{c-Hex})^{\bullet-}$	absorption band with λ_{max} in the vicinity of 580 nm, too short lifetime at room temperature, absorption spectrum was recorded only at 77K	S. Arai, M. Hoshino and M. Imamura, The Journal of Physical Chemistry, 1975, 79, 702-707
neutral ketyl radicals of cyclohexanone $(\text{c-Hex})^{\bullet}$	absorption band with λ_{max} at 230 nm	M. Simic, P. Neta and E. Hayon, The Journal of Physical Chemistry, 1969, 73, 3794-3800

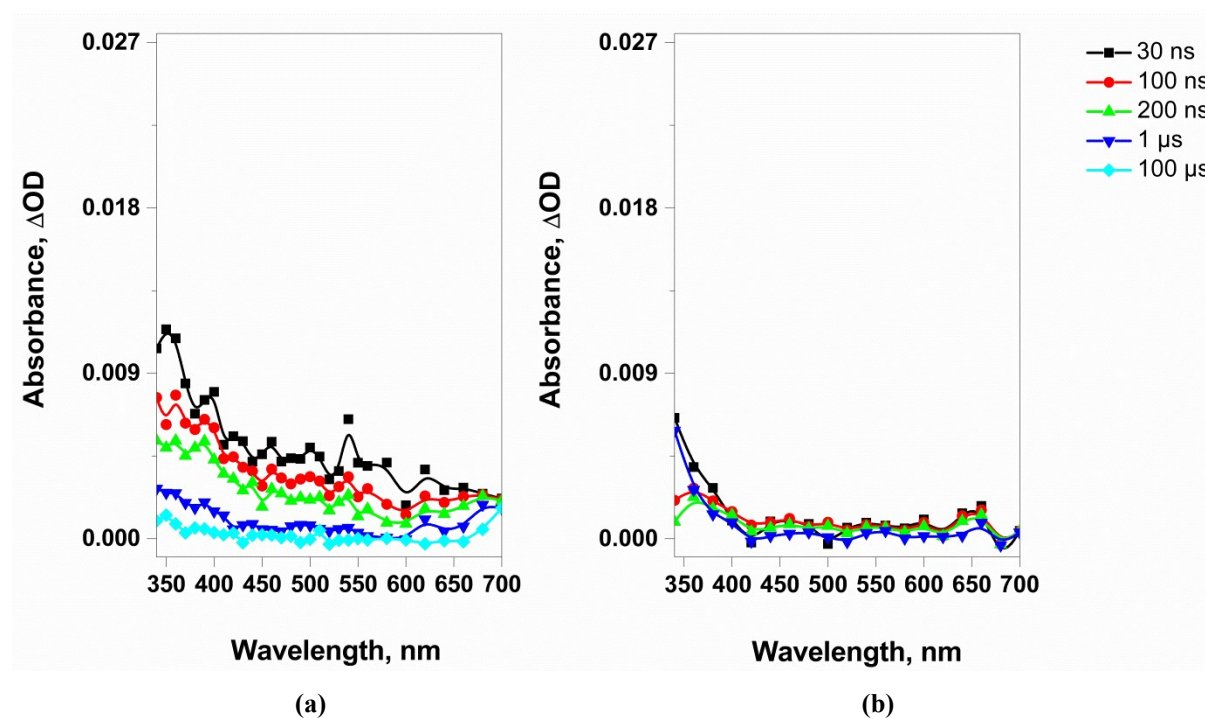


Figure S4. Transient absorption spectra recorded at different time points after an electron pulse during radiolysis of Ar-saturated samples: (a) pure cyclohexanone and (b) cyclohexanone pre-equilibrated with 1M HNO_3 . Dose: 20 Gy/pulse.

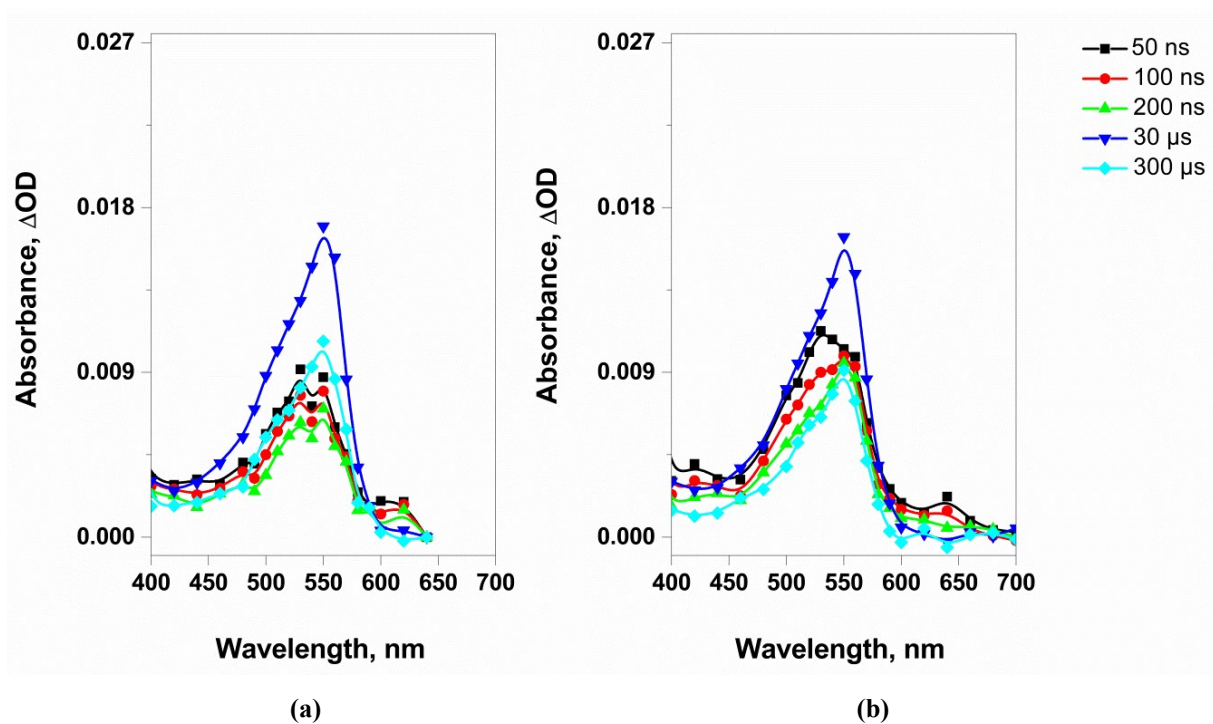


Figure S5. Transient absorption spectra of Ar-saturated solutions of 200 mM benzophenone in cyclohexanone, pre-equilibrated with: (a) 1M HClO₄ and (b) 1M HNO₃. Dose: 20 Gy/pulse.