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Supplementary Information for

Stoichiometry of An(III)-DMDOHEMA complexes formed during solvent extraction

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Fluorescence lifetime of Cm(III) in 1-octanol and 1-octanol with 1.7 mol/L water

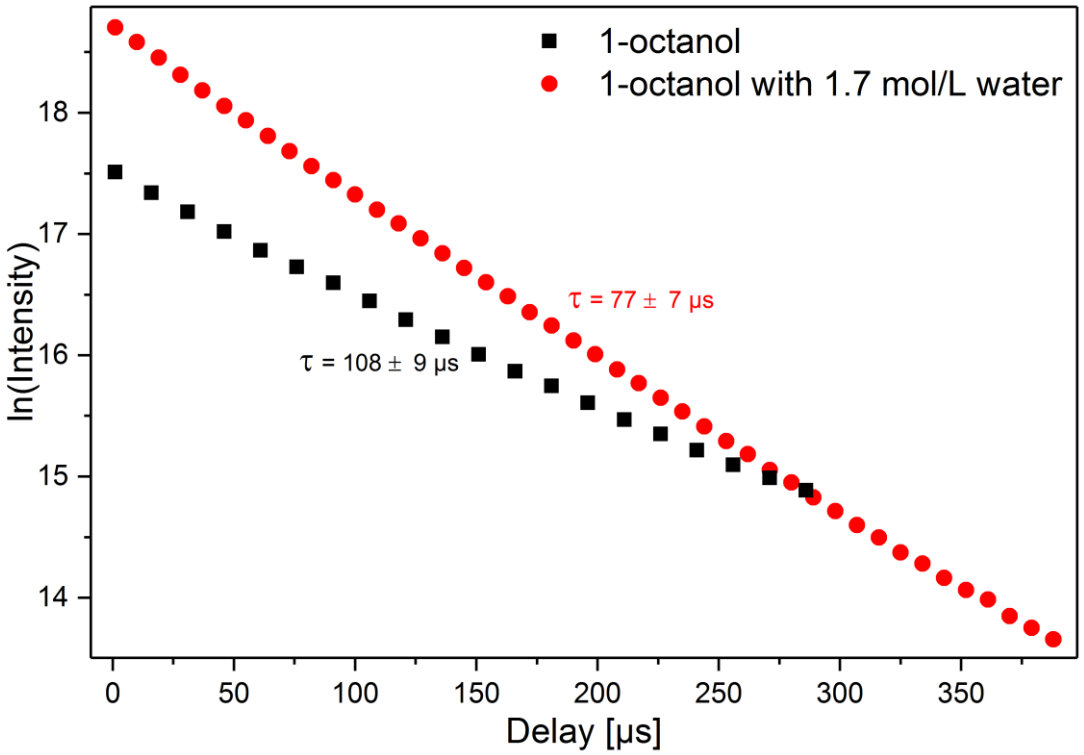

Fig. S 1 Decrease of the fluorescence intensity of Cm(III) in 1-octanol and 1-octanol with 1.7 mol/L water with increasing delay (c(Cm) = 1 x 10^{-7} mol/L))

Fluorescence spectra of Cm(III) in the aqueous phase from extraction experiments

Influence of the proton concentration

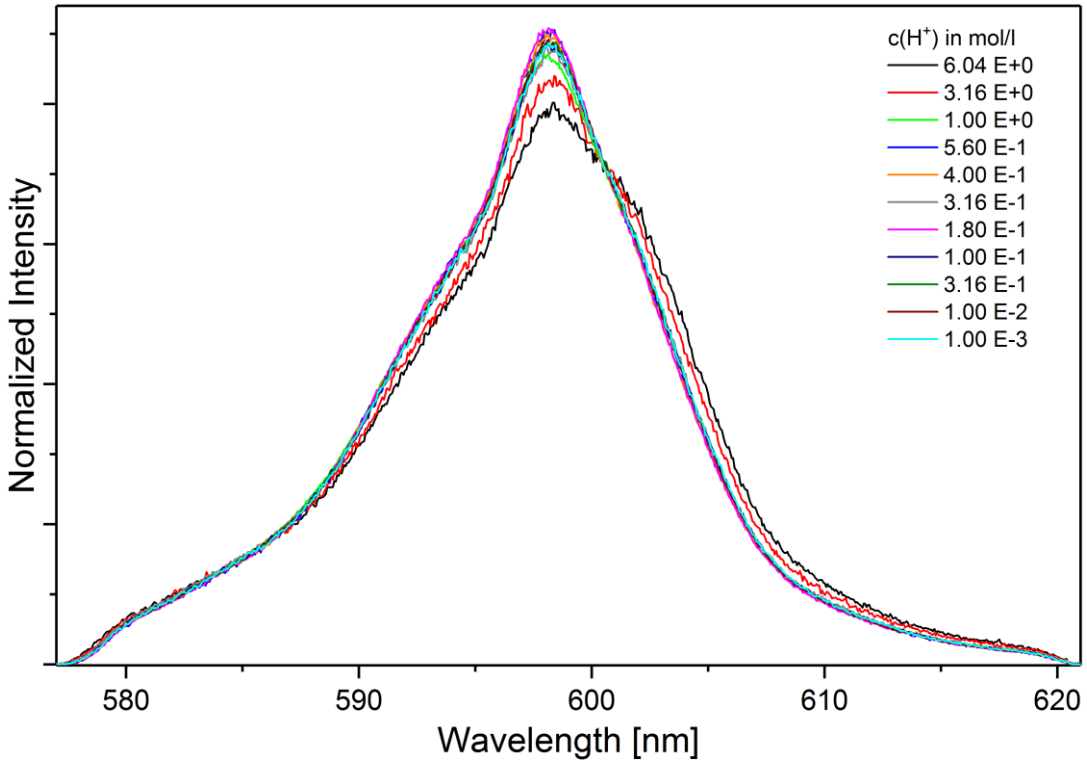

Fig. S 2 Normalized fluorescence emission spectra of Cm(III) in aqueous phases from solvent extraction experiments at varied proton concentrations. ($c(Cm(III))_{ini}$ = 1 x 10^{-7} mol/L, $c(NO_3^-)_{ini}$ = 6.0 mol/L), $c(DMDOHEMA)_{ini}$ = 0.4 mol/L)

Fluorescence lifetime of Cm(III) in the organic and aqueous phase of extraction experiments

Influence of the proton concentration

Organic phase

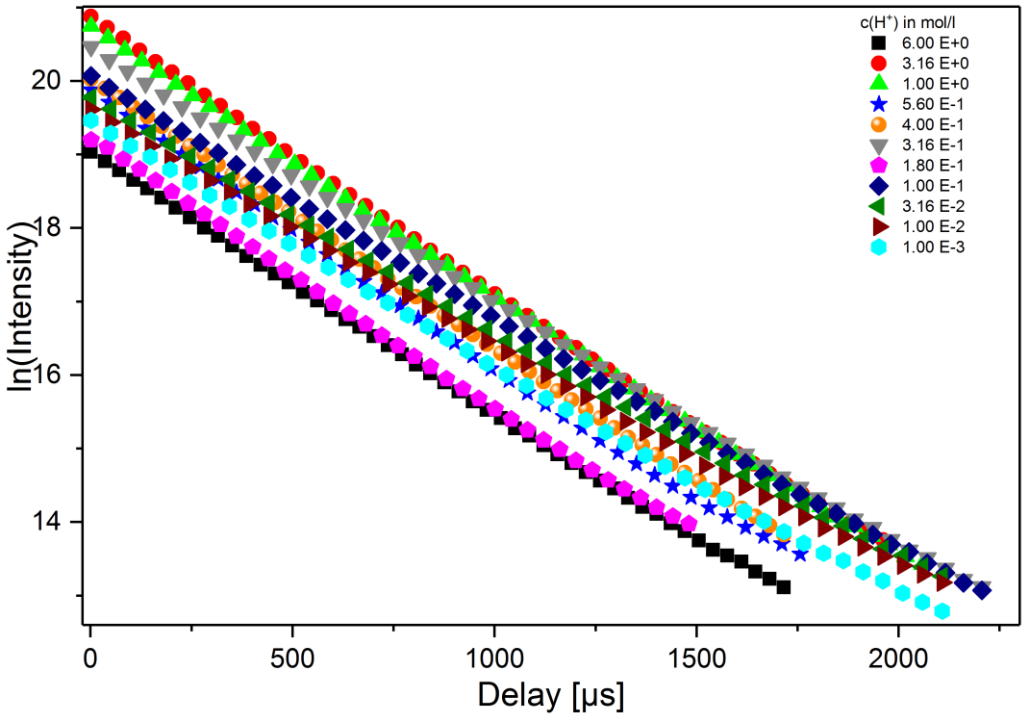

Fig. S 3 Decay of the fluorescence intensity in the organic phase at varied proton concentrations. $c(Cm(III))_{ini}$ = 1 x 10^{-7} mol/L, $c(NO_3^-)_{ini}$ = 6.0 mol/L), $c(DMDOHEMA)_{ini}$ = 0.4 mol/L.

Aqueous phase

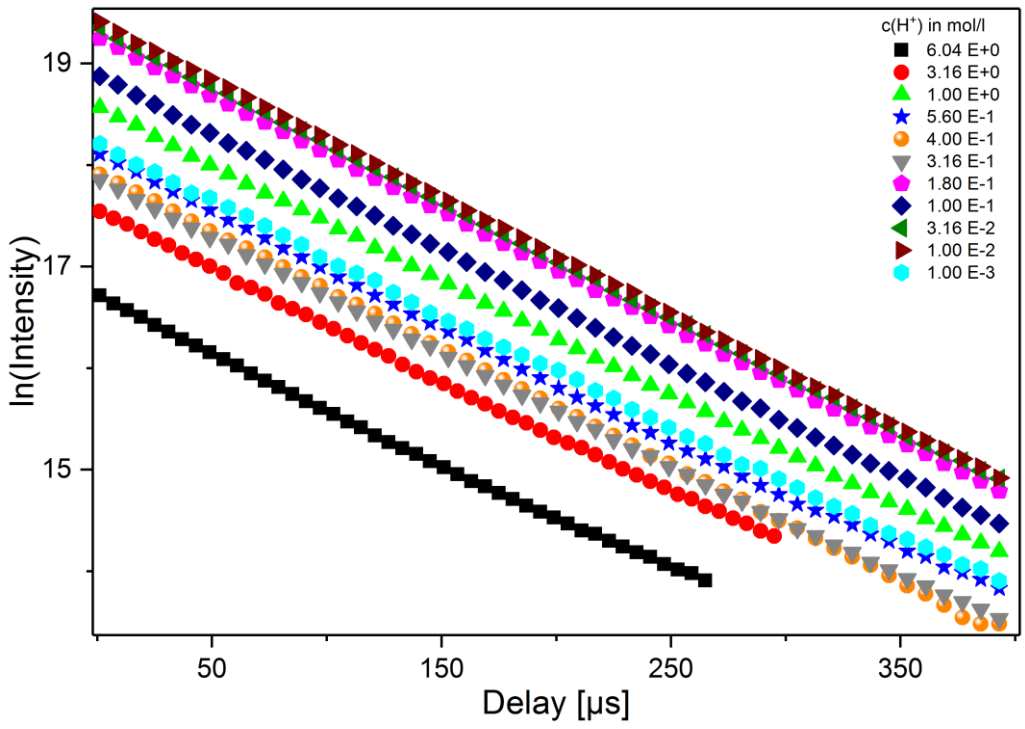

Fig. S 4 Decay of the fluorescence intensity in the aqueous phase at varied proton concentrations. $c(Cm(III))_{ini}$ = 1 x 10^{-7} mol/L, $c(NO_3^-)_{ini}$ = 6.0 mol/L), $c(DMDOHEMA)_{ini}$ = 0.4 mol/L.

Tabulation

$$n(H_2O) = 0.65 \cdot k_{obs}[ms^{-1}] - 0.88 \quad (1)$$

Tab. S 1 Fluorescence lifetime (τ) of Cm(III) in both organic and aqueous phases from solvent extraction experiments at varied proton concentrations. ($c(Cm(III))_{ini}$ = 1 x 10^{-7} mol/L, $c(NO_3^-)_{ini}$ = 6.0 mol/L), $c(DMDOHEMA)_{ini}$ = 0.4 mol/L). The number of water molecules ($n(H_2O)$) in the first coordination sphere is calculated by equation 1.

$c(H^+)$ [mol/L]	$c(NO_3^-)$ [mol/L]	c(DMDOHEMA) [mol/L]	τ_{org} [µs]	$n(H_2O)_{org}$	τ_{aq} [µs]	$n(H_2O)_{aq}$
6.04 E+0	6.04 E+0	4.00 E-1	281 ± 9	1.4 ± 0.5	94 ± 7	6.0 ± 0.5
3.16 E+0	6.04 E+0	4.00 E-1	267 ± 8	1.6 ± 0.5	91 ± 5	6.2 ± 0.5
1.00 E+0	6.04 E+0	4.00 E-1	273 ± 8	1.5 ± 0.5	89 ± 5	6.4 ± 0.5
5.60 E-1	6.04 E+0	4.00 E-1	265 ± 12	1.6 ± 0.5	88 ± 5	6.5 ± 0.5
4.00 E-1	6.04 E+0	4.00 E-1	273 ± 12	1.5 ± 0.5	87 ± 8	6.6 ± 0.5
3.16 E-1	6.04 E+0	4.00 E-1	291 ± 11	1.4 ± 0.5	90 ± 5	6.5 ± 0.5
1.80 E-1	6.04 E+0	4.00 E-1	275 ± 11	1.5 ± 0.5	91 ± 5	6.3 ± 0.5
1.00 E-1	6.04 E+0	4.00 E-1	315 ± 12	1.2 ± 0.5	88 ± 5	6.5 ± 0.5
3.16 E-2	6.04 E+0	4.00 E-1	315 ± 12	1.2 ± 0.5	88 ± 5	6.5 ± 0.5
1.00 E-2	6.04 E+0	4.00 E-1	315 ± 12	1.2 ± 0.5	88 ± 5	6.5 ± 0.5
1.00 E-3	6.04 E+0	4.00 E-1	301 ± 11	1.3 ± 0.5	90 ± 5	6.6 ± 0.5

Influence of the nitrate concentration

Tab. S 2 Fluorescence lifetime (τ) of Cm(III) in both organic and aqueous phases in extraction experiments at varied nitrate concentrations. ($c(Cm(III))_{ini}$ = 1 x 10^{-7} mol/L, $c(H^+)_{ini}$ = 1 mol/L), $c(DMDOHEMA)_{ini}$ = 0.4 mol/L). The number of water molecules ($n(H_2O)$) in the first coordination sphere are calculated by equation 1.

$c(NO_3^-)$ [mol/L]	$c(H^+)$ [mol/L]	c(DMDOHEMA) [mol/L]	τ_{org} [µs]	$n(H_2O)_{org}$	τ_{aq} [µs]	$n(H_2O)_{aq}$
6.04 E+0	1.00 E+0	4.00 E-1	273 ± 8	1.4 ± 0.5	90 ± 7	6.3 ± 0.5
5.00 E+0	1.00 E+0	4.00 E-1	321 ± 13	1.1 ± 0.5	88 ± 6	6.5 ± 0.5
2.00 E+0	1.00 E+0	4.00 E-1	250 ± 10	1.5 ± 0.5	78 ± 6	7.4 ± 0.5
1.00 E+0	1.00 E+0	4.00 E-1	306 ± 12	1.2 ± 0.5	76 ± 5	7.8 ± 0.5

Comparison of the vibronic sideband spectra of the organic phases extracted from aqueous and deuterated phases

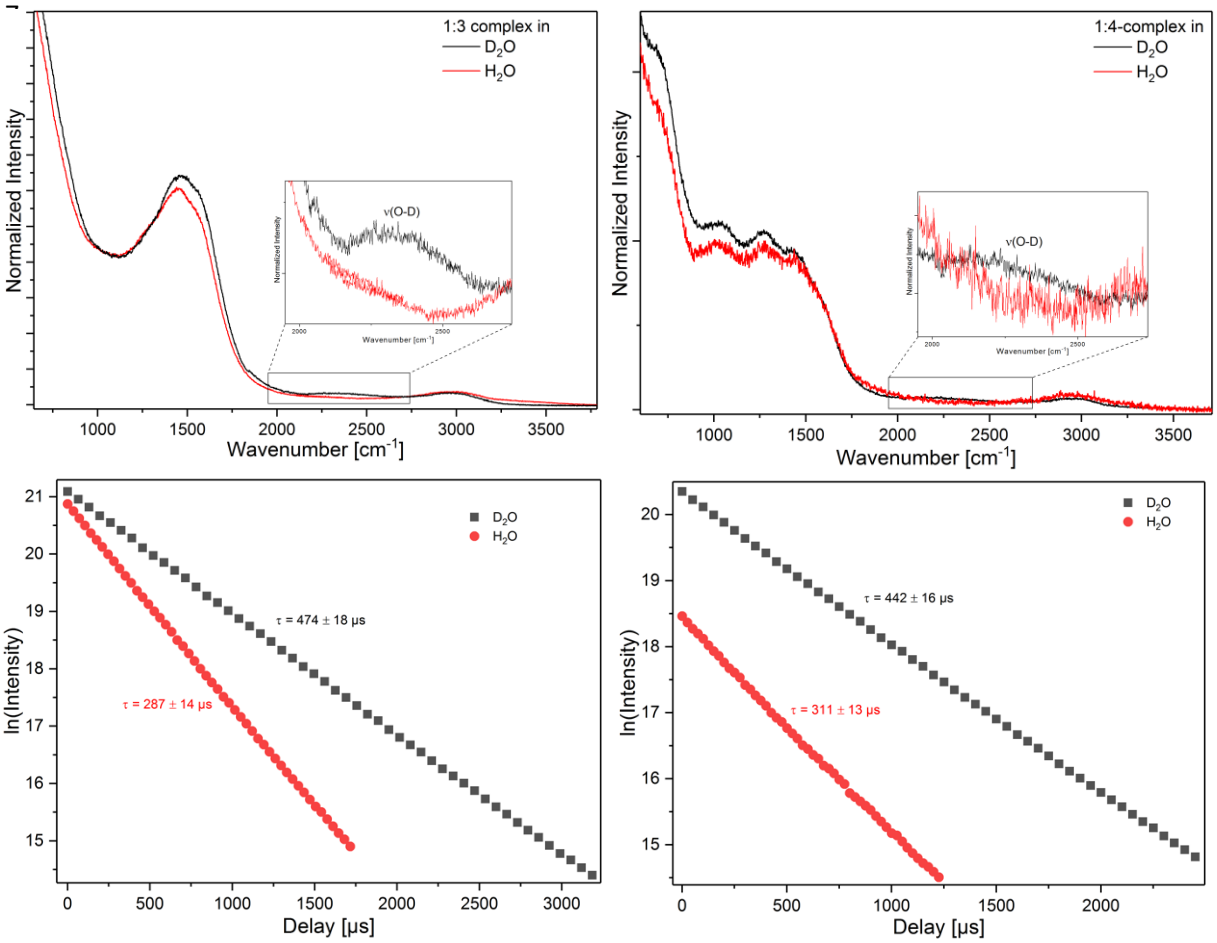

Fig. S 5 Top: Comparison of the vibronic side-band spectra of the 1:3 Cm(III)-DMDOHEMA (left) and 1:4 Cm(III)-DMDOHEMA complexes (right) extracted from aqueous and deuterated phases. Bottom: Decay of the fluorescence intensity. 1:3 (left) and 1:4 (right) Cm(III)-DMDOHEMA complexes. c(Cm(III))$_{ini}$ = 1 x 10^{-7} mol/L; c(DMDOHEMA) = 0.4 mol/L; c(NO_3^-)$_{ini}$ = 6.0 mol/L, c(H^+)$_{ini}$ = 6.0 mol/L (1:3 complex) and 10^{-3} mol/L (1:4 complex).