Supplementary Material

Is it Reliable to Determine the Stoichiometry of Extraction Complexes Using Classic Slope Analysis Model?

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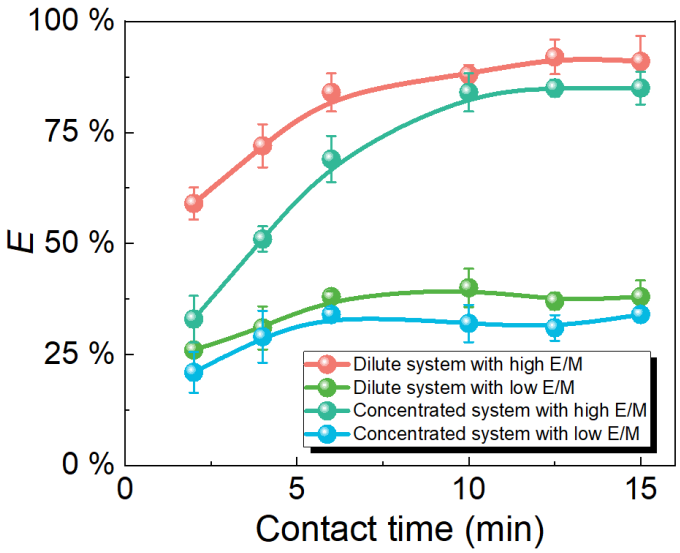

Figure S1 Dependence of extraction effectiveness (*E*) for Y(III) with the functions of contact time.

Table S1 Solution condition, corrected parameters about activity coefficient, and corresponding *D* values. [HA]: extractant content (mol/dm^3); [H^+]: proton concentration (mol/dm^3 HNO_3); V_m: molar volume (cm^3/mol) of the organic phase containing weighted by mole fractions of solvent and solutes; *I*: aqueous ionic strength (mmol/dm^3); γ_H: activity coefficient for proton; γ_Y: activity coefficient for Y(III); *D*: distribution ratio of Y(III).

[HA]	[H^+]	V_m	*I*	γ_H	γ_Y	*D*
Dilute system with high ratio of extractant to metal ions						
$[Y(III)]_{ini} = 1 \times 10^{-6}$ mol/dm^3; $[NaNO_3]_{ini} = 1 \times 10^{-4}$ mol/dm^3.						
5.0×10^{-5}		148.66				4.46
5.1×10^{-5}		148.69				5.05
5.2×10^{-5}		148.71				5.58
5.3×10^{-5}		148.74				6.12
	1.0×10^{-4}					
5.4×10^{-5}		148.76				7.60
5.5×10^{-5}		148.79				8.22
5.6×10^{-5}		148.81				8.51
5.7×10^{-5}		148.84				9.33
	0.7×10^{-4}		0.176	0.985	0.875	15.24
	0.8×10^{-4}		0.186	0.985	0.871	10.32
	0.9×10^{-4}		0.196	0.984	0.868	7.22
5.0×10^{-5}	1.0×10^{-4}		0.206	0.984	0.865	4.46
	1.1×10^{-4}		0.216	0.984	0.862	4.35
	1.2×10^{-4}		0.226	0.983	0.860	2.86
	1.3×10^{-4}		0.236	0.983	0.857	2.24

	1.4×10^{-4}		0.246	0.983	0.854	2.18

[HA]	$[H^+]$	V_m	I	γ_H	γ_Y	D
Dilute system with low ratio of extractant to metal ions						
$[Y(III)]_{ini} = 1 \times 10^{-6}$ mol/dm^3; $[NaNO_3]_{ini} = 1 \times 10^{-4}$ mol/dm^3.						
5.0×10^{-6}		147.48				0.11
5.5×10^{-6}		147.50				0.15
6.0×10^{-6}		147.51				0.21
6.5×10^{-6}		147.52				0.24
	1.0×10^{-4}					
7.0×10^{-6}		147.54				0.33
7.5×10^{-6}		147.55				0.46
8.0×10^{-6}		147.56				0.47
8.5×10^{-6}		147.58				0.62
	0.7×10^{-4}		0.176	0.985	0.875	0.67
	0.8×10^{-4}		0.186	0.985	0.871	0.60
	0.9×10^{-4}		0.196	0.984	0.868	0.55
	1.0×10^{-4}		0.206	0.984	0.865	0.48
8.0×10^{-6}						
	1.1×10^{-4}		0.216	0.984	0.862	0.38
	1.2×10^{-4}		0.226	0.983	0.860	0.31
	1.3×10^{-4}		0.236	0.983	0.857	0.26
	1.4×10^{-4}		0.246	0.983	0.854	0.22

[HA]	[H^+]	V_m	I	γ_H	γ_Y	D
Concentrated system with high ratio of extractant to metal ions						
$[Y(III)]_{ini} = 1 \times 10^{-3}$ mol/dm^3; $[NaNO_3]_{ini} = 1 \times 10^{-1}$ mol/dm^3.						
5.0×10^{-2}		304.92				3.86
5.1×10^{-2}		305.29				4.48
5.2×10^{-2}		305.65				4.55
5.3×10^{-2}	1.0×10^{-1}	306.00				5.48
5.4×10^{-2}		306.33				5.84
5.5×10^{-2}		306.65				6.66
5.6×10^{-2}		306.97				7.14
5.7×10^{-2}		307.27				7.55
	0.6×10^{-1}		206	0.725	0.065	13.30
	0.7×10^{-1}		216	0.722	0.063	9.02
	0.8×10^{-1}		226	0.720	0.062	8.45
	0.9×10^{-1}		236	0.717	0.060	5.67
5.0×10^{-2}	1.0×10^{-1}		246	0.714	0.058	3.86
	1.1×10^{-1}		256	0.712	0.057	2.55
	1.2×10^{-1}		266	0.710	0.056	2.43
	1.3×10^{-1}		276	0.708	0.054	1.59

[HA]	[H^+]	V_m	I	γ_H	γ_Y	D
Concentrated system with low ratio of extractant to metal ions						
$[Y(III)]_{ini} = 1 \times 10^{-3}$ mol/dm^3; $[NaNO_3]_{ini} = 1 \times 10^{-1}$ mol/dm^3.						
5.0×10^{-3}		223.19				0.07
5.5×10^{-3}		227.38				0.13
6.0×10^{-3}		231.25				0.16
6.5×10^{-3}		234.83				0.21
	1.0×10^{-1}					
7.0×10^{-3}		238.14				0.27
7.5×10^{-3}		241.23				0.34
8.0×10^{-3}		244.10				0.39
8.5×10^{-3}		246.79				0.51
	0.6×10^{-1}		206	0.725	0.065	0.92
	0.7×10^{-1}		216	0.722	0.063	0.80
	0.8×10^{-1}		226	0.720	0.062	0.58
	0.9×10^{-1}		236	0.717	0.060	0.47
8.0×10^{-3}						
	1.0×10^{-1}		246	0.714	0.058	0.39
	1.1×10^{-1}		256	0.712	0.057	0.36
	1.2×10^{-1}		266	0.710	0.056	0.25
	1.3×10^{-1}		276	0.708	0.054	0.22