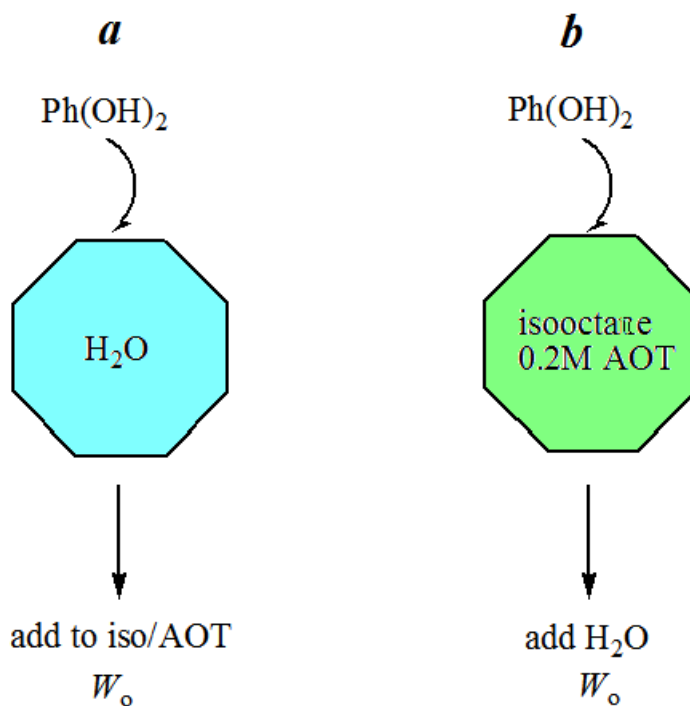


SUPPLEMENTAL INFORMATION

Figure S1: Schematic of sample preparation for methods *a* and *b*.



- a*) Common RM sample preparation for hydrophilic reactant
b) Alternative sample preparation for amphiphilic reactant

Table S1: Kinetics data for the complexation of a variety of catechols with vanadium(V).
Conditions: T= 25.0°C and [H⁺] = 0.092 M (HClO₄).

S1A: Catechol

Media	[V(V)] (M)	[H ₂ cat] (M)	k _{obs} (s ⁻¹)	k _f (M ⁻¹ s ⁻¹)	k _r (s ⁻¹)	K (M ⁻¹)
Aqueous	0.010	3.6 x 10 ⁻⁴	130	(1.0 ± 0.1) x 10 ⁴	44 ± 2	2.0 x 10 ²
	0.0080		112			
	0.0030		68			
	0.0020		61			
	0.0015		57			
	1.0 x 10 ⁻⁴	0.010	135	(1.4 ± 0.1) x 10 ⁴	52 ± 1	2.7 x 10 ²
		0.0030	79			
		0.0020	77			
		0.0019	73			
		0.0014	63			
	4.8 x 10 ⁻⁴	0.029	142	(1.2 ± 0.1) x 10 ⁴	68 ± 1	1.8 x 10 ²
		0.017	120			
		0.010	81			
		0.0060	62			
		0.0030	82.6			
w _o 30 ^a	4.1 x 10 ⁻⁴	0.057	200	(2.4 ± 0.1) x 10 ⁴	52 ± 2	4.6 x 10 ²
		0.034	144			
		0.023	111			
		0.011	85			
		0.0060	67			
w _o 20 ^a	0.011	1.8 x 10 ⁻⁴	66	(1.9 ± 0.2) x 10 ⁴	51 ± 1	3.7 x 10 ²

	0.0090		63			
	0.0060		60			
	0.0040		56			
	0.0030		58			
	2.3×10^{-4}	0.010	68	$(2.3 \pm 0.1) \times 10^4$	40 ± 1	5.7×10^2
		0.0080	63			
		0.0060	58			
		0.0040	52			
		0.0030	54			
$w_o 20^d$	5.0×10^{-4}	0.051	159	$(1.8 \pm 0.1) \times 10^4$	70 ± 10	2.6×10^2
		0.041	140			
		0.020	103			
		0.010	86			
		0.0050	80			

Media	[V(V)] (M)	[H ₂ cat] (M)	k _{obs} (s ⁻¹)	k _f (M ⁻¹ s ⁻¹)	k _r (s ⁻¹)	K (M ⁻¹)
$w_o 20^e$	3×10^{-4}	0.029	340	$(1.4 \pm 0.1) \times 10^4$	60 ± 3	2.3×10^2
		0.014	192			
		0.009	144			
		0.006	115			
		0.004	106			
		0.003	86			
$w_o 10^a$	0.0019	0.099	116	$(1.9 \pm 0.0) \times 10^4$	47 ± 2	4.0×10^2
		0.079	105			
		0.059	85			
		0.040	75			
		0.020	62			
	0.0013	0.140	142	$(1.9 \pm 0.1) \times 10^4$	42 ± 1	4.5×10^2
		0.110	120			

		0.056	81			
		0.028	62			
		0.014	53			
$w_o 10^f$	7×10^{-4}	0.049	N/A	$(1.8 \pm 0.1) \times 10^4$	90 ± 25	2.0×10^2
		0.029	600			
		0.022	460			
		0.015	370			
		0.0070	207			
$w_o 5^a$	9×10^{-4}	0.103	65	$(1.9 \pm 0.1) \times 10^4$	28 ± 1	6.8×10^2
		0.082	57			
		0.062	49			
		0.041	42			
		0.021	36			
$w_o 2^a$	4×10^{-3}	0.288	46	$(1.8 \pm 0.1) \times 10^4$	8 ± 1	2.3×10^3
		0.187	34			
		0.144	26			
		0.072	18			
		0.043	15			

^a reverse micelle preparation method *a*, ^b reverse micelle preparation *b* Conditions: T= 25° C, [HClO₄] = 0.092 M, ^a reverse micelle preparation method *a*, ^b reverse micelle preparation *b*, ^c catechol dissolved in pre-assembled reverse micelle, ^d 24 hour aged solutions prepared via method *a*, ^e method *a* with 0.4M AOT/iso ^f 24 hour aged solutions prepared via method *b*.