Supplementary Informations

Figure Captions

SI Fig. 1 Plot of k against complex ion for Cis-$[Co(dpq)_2(C_{12}H_{25}NH_2)_2](ClO_4)_3$ under various temperatures; Cis-$[Co(dpq)_2(C_{12}H_{25}NH_2)_2](ClO_4)_3$ = 4 x 10^{-4} mol dm^{-3}, μ = 1.0 mol dm^{-3}, $[Fe^{2+}]$ = 0.01 mol dm^{-3}

SI Fig. 2 Plot of k against complex ion for Cis-$[Co(dpqc)_2(C_{12}H_{25}NH_2)_2](ClO_4)_3$ under various temperatures; Cis-$[Co(dpqc)_2(C_{12}H_{25}NH_2)_2](ClO_4)_3$ = 4 x 10^{-4} mol dm^{-3}, μ = 1.0 mol dm^{-3}, $[Fe^{2+}]$ = 0.01 mol dm^{-3}

SI Fig. 3 Plot of k against [β-CD] for Cis-$[Co(dpq)_2(C_{12}H_{25}NH_2)_2](ClO_4)_3$ at various temperatures; Cis-$[Co(dpq)_2(C_{12}H_{25}NH_2)_2](ClO_4)_3$ =4 x 10^{-4} mol dm^{-3}, μ = 1.0 mol dm^{-3}, $[Fe^{2+}]$ = 0.01 mol dm^{-3}

SI Fig. 4 Plot of k against [β-CD] for Cis-$[Co(dpqc)_2(C_{12}H_{25}NH_2)_2](ClO_4)_3$ at various temperatures; Cis-$[Co(dpqc)_2(C_{12}H_{25}NH_2)_2](ClO_4)_3$ = 4 x 10^{-4} mol dm^{-3}, μ = 1.0 mol dm^{-3}, $[Fe^{2+}]$ = 0.01 mol dm^{-3}

SI Fig. 5 Eyring plot for Cis-$[Co(dpq)_2(C_{12}H_{25}NH_2)_2](ClO_4)_3$ in aqueous medium. [Complex] = 4 x 10^{-4} mol dm^{-3}; $[Fe^{2+}]$ = 0.01 mol dm^{-3}; [μ] = 1.0 mol dm^{-3}.

SI Fig. 6 Eyring plot for Cis-$[Co(dpqc)_2(C_{12}H_{25}NH_2)_2](ClO_4)_3$ in aqueous medium. [Complex] = 4 x 10^{-4} mol dm^{-3}; $[Fe^{2+}]$ = 0.01 mol dm^{-3}; [μ] = 1.0 mol dm^{-3}.

SI Fig. 7 Eyring plot for Cis-$[Co(dpq)_2(C_{12}H_{25}NH_2)_2](ClO_4)_3$ in [β-CD] medium. [Complex] = 4 x 10^{-4} mol dm^{-3}; $[Fe^{2+}]$ = 0.01 mol dm^{-3}; [μ] = 1.0 mol dm^{-3}, [β-CD] = 1.8 x 10^{-3}.

SI Fig. 8 Eyring plot for Cis-$[Co(dpqc)_2(C_{12}H_{25}NH_2)_2](ClO_4)_3$ in [β-CD] medium. [Complex] = 4 x 10^{-4} mol dm^{-3}; $[Fe^{2+}]$ = 0.01 mol dm^{-3}; [μ] = 1.0 mol dm^{-3}, [β-CD] = 1.8 x 10^{-3}.

SI Fig. 9 Isokinetic plot of the activation parameters for the reduction of Cis-$[Co(dpq)_2(C_{12}H_{25}NH_2)_2](ClO_4)_3$ by ion(II) in aqueous solutions. [Complex] = 4 x 10^{-4} mol dm^{-3}; $[Fe^{2+}]$ = 0.01 mol dm^{-3}; [μ] = 1.0 mol dm^{-3}.

SI Fig. 10 Isokinetic plot of the activation parameters for the reduction of Cis-$[Co(dpqc)_2(C_{12}H_{25}NH_2)_2](ClO_4)_3$ by ion(II) in aqueous solutions. [Complex] = 4 x 10^{-4} mol dm^{-3}; $[Fe^{2+}]$ = 0.01 mol dm^{-3}; [μ] = 1.0 mol dm^{-3}.

SI Fig. 11 Isokinetic plot of the activation parameters for the reduction of Cis-$[Co(dpq)_2(C_{12}H_{25}NH_2)_2](ClO_4)_3$ by ion(II) in β-cyclodextrin medium. [Complex] = 4 x 10^{-4} mol dm^{-3}; $[Fe^{2+}]$ = 0.01 mol dm^{-3}; [μ] = 1.0 mol dm^{-3}.

SI Fig. 12 Isokinetic plot of the activation parameters for the reduction of Cis-$[Co(dpqc)_2(C_{12}H_{25}NH_2)_2](ClO_4)_3$ by ion(II) in β-cyclodextrin mediem. [Complex] = 4 x 10^{-4} mol dm^{-3}; $[Fe^{2+}]$ = 0.01 mol dm^{-3}; [μ] = 1.0 mol dm^{-3}.

Table Captions

SI Table 1. Second-order rate constants for the reduction of cobalt(III) complex ion by Fe^{2+} in aqueous solutions under various temperatures. Cis-$[Co(dpq)_2(C_{12}H_{25}NH_2)_2](ClO_4)_3$ = 4 x 10^{-4} mol dm^{-3}, μ = 1.0 mol dm^{-3}, $[Fe^{2+}]$ = 0.01 mol dm^{-3}

SI Table 2. Second-order rate constants for the reduction of cobalt(III) complex ion by Fe^{2+} in aqueous solutions under various temperatures. Cis-$[Co(dpqc)_2(C_{12}H_{25}NH_2)_2](ClO_4)_3$ = 4 x 10^{-4} mol dm^{-3}, μ = 1.0 mol dm^{-3}, $[Fe^{2+}]$ = 0.01 mol dm^{-3}

SI Table 3. Second-order rate constants for the reduction of cobalt(III) complex ion by Fe^{2+} in the presence of β-cyclodextrin under various temperatures. Cis-$[Co(dpq)_2(C_{12}H_{25}NH_2)_2](ClO_4)_3$ = 4 x 10^{-4} mol dm^{-3}, μ = 1.0 mol dm^{-3}, $[Fe^{2+}]$ = 0.01 mol dm^{-3}

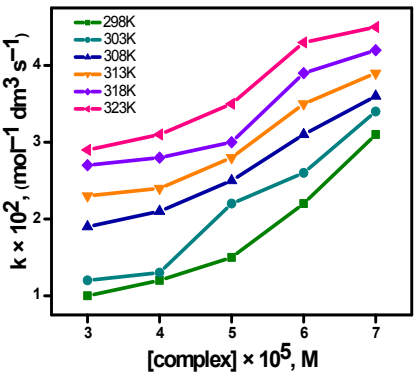
SI Table 4. Second-order rate constants for the reduction of cobalt(III) complex ion by Fe^{2+} in the presence of β-cyclodextrin under various temperatures. Cis-$[Co(dpqc)_2(C_{12}H_{25}NH_2)_2](ClO_4)_3$ = 4 x 10^{-4} mol dm^{-3}, μ = 1.0 mol dm^{-3}, $[Fe^{2+}]$ = 0.01 mol dm^{-3}

SI Table 5. Activation parameters for the reduction of Cis-$[Co(dpq)_2(C_{12}H_{25}NH_2)_2](ClO_4)_3$, μ = 1.0 $moldm^{-3}$ in micelles medium

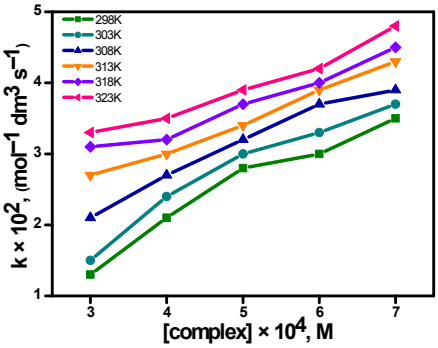
SI Table 6. Activation parameters for the reduction of Cis-$[Co(dpqc_2(C_{12}H_{25}NH_2)_2](ClO_4)_3$, μ = 1.0 $moldm^{-3}$ in micelles medium

SI Table 7. Activation parameters for the reduction of Cis-$[Co(dpq)_2(C_{12}H_{25}NH_2)_2](ClO_4)_3$, μ = 1.0 $moldm^{-3}$ in β-CD medium

SI Table 8. Activation parameters for the reduction of Cis-$[Co(dpqc)_2(C_{12}H_{25}NH_2)_2](ClO_4)_3$, μ = 1.0 $moldm^{-3}$ in β-CD medium



SI Fig. 1



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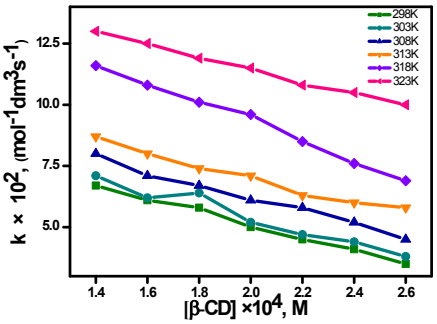

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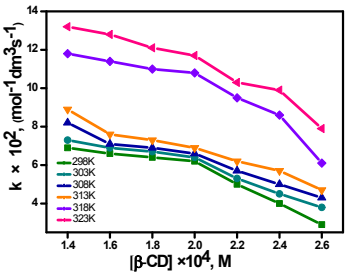

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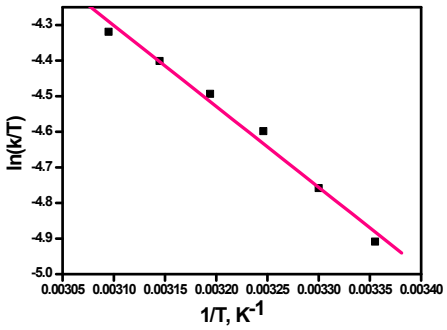

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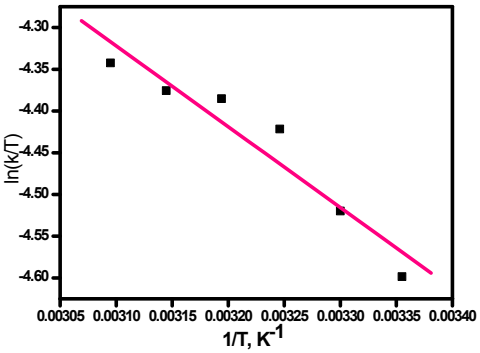

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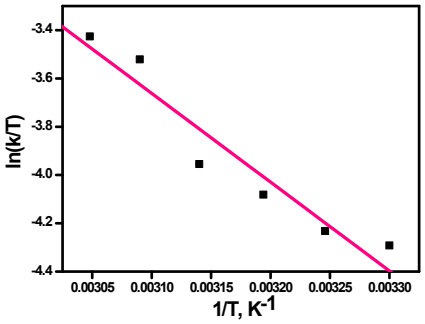

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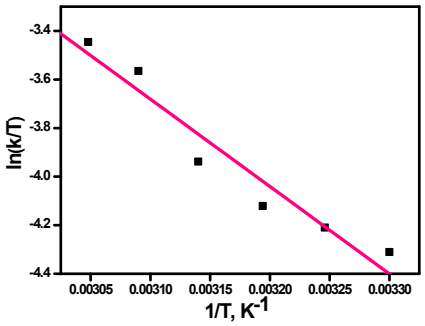

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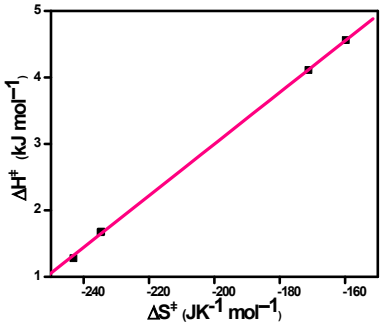

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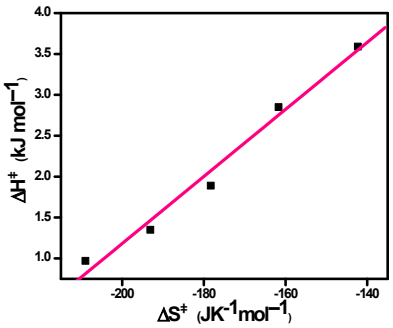

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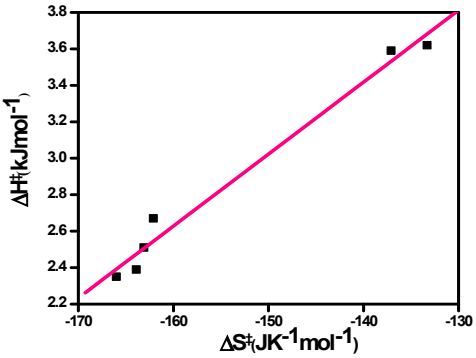

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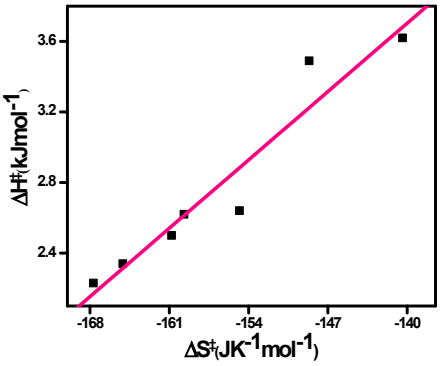

SI Fig. 12

SI Table 1

[Complex] × 10^4, mol dm^{-3}	k ×10^2, dm^3 mol^{-1} s^{-1}					
	298K	303K	308K	313K	318K	23K
3.0	1.0	1.2	1.9	2.3	2.7	2.9
4.0	1.2	1.3	2.1	2.4	2.8	3.1
5.0	1.5	2.2	2.5	2.8	3.0	3.6
6.0	2.2	3.1	3.4	3.5	3.9	4.5
7.0	3.1	3.4	3.9	4.3	4.5	4.9

SI Table 2

[Complex] $\times 10^4$, mol dm^{-3}	k $\times 10^2$, dm^3 mol^{-1} s^{-1}					
	298K	303K	308K	313K	318K	323K
3.0	1.6	1.8	2.0	2.7	3.3	3.5
4.0	2.1	2.4	2.4	3.0	3.5	3.9
5.0	2.8	3.0	3.2	3.4	3.7	4.0
6.0	3.0	3.3	3.3	3.9	4.0	4.4
7.0	3.8	4.1	4.6	5.1	5.6	5.9

SI Table 3

[β-cyclodextrin] $\times 10^4$, mol dm^{-3}	k $\times 10^2$, dm^3 mol^{-1} s^{-1}					
	298K	303K	308K	313K	318K	323K
1.4	6.7	7.1	8.0	8.7	11.6	13.0
1.6	6.1	6.2	7.1	8.0	10.8	12.5
1.8	5.8	6.4	6.7	7.4	10.1	11.9
2.0	5.0	5.2	6.1	7.1	9.6	11.5
2.2	4.5	4.7	5.8	6.3	8.5	11.2
2.4	4.0	4.4	5.2	6.0	7.6	10.5
2.6	3.5	3.8	4.5	5.8	6.9	10.0

SI Table 4

[β-cyclodextrin] $\times 10^4$, mol dm^{-3}	k $\times 10^2$, dm^3 mol^{-1} s^{-1}					
	298K	303K	308K	313K	318K	323K
1.4	6.9	7.3	8.2	8.9	11.8	13.2
1.6	6.6	6.9	7.1	7.6	11.4	12.8
1.8	6.4	6.7	6.9	7.3	11.0	12.2
2.0	6.2	6.4	6.6	6.9	10.8	11.5
2.2	5.0	5.3	5.7	6.2	9.5	11.4
2.4	4.2	4.5	5.0	5.7	8.6	11.0
2.6	2.9	3.8	4.3	4.7	6.1	10.5

SI Table 5

[Complex] $\times 10^4$, mol dm^{-3}	$\Delta H^{\ddagger}$ $kJmol^{-1}$	$\Delta S^{\ddagger}$ JK^{-1}
3.0	1.11	-204.5
4.0	2.27	-174.7
5.0	2.61	-167.8
6.0	3.70	-140.4
7.0	4.08	-130.9

SI Table 6

[Complex] × 10^4, mol dm^{-3}	$\Delta H^{\ddagger}$ $kJmol^{-1}$	$\Delta S^{\ddagger}$ JK^{-1}
3.0	0.97	-209.0
4.0	1.35	-193.1
5.0	1.89	-178.3
6.0	2.85	-161.7
7.0	3.59	-142.3

SI Table 7

[β-cyclodextrin] × 10^3, mol dm^{-3}	$\Delta H^{\ddagger}$ $kJmol^{-1}$	$\Delta S^{\ddagger}$ JK^{-1}
1.4	2.35	-166.0
1.6	2.39	-163.9
1.8	2.51	-163.1
2.0	2.67	-162.1
2.2	3.59	-137.1
2.4	3.62	-133.3

SI Table 8

[β-cyclodextrin] × 10^3, mol dm^{-3}	$\Delta H^{\ddagger}$ $kJmol^{-1}$	$\Delta S^{\ddagger}$ JK^{-1}
1.4	2.23	-167.7
1.6	2.34	-165.1
1.8	2.50	-160.8
2.0	2.62	-159.7
2.2	2.64	-154.8
2.4	3.49	-148.7
2.6	3.62	-140.4