Table 2. Effect of varying [BAB] and [aryloximes]$_o$ on the reaction rate at 303 K.

10^4 [BAB] (mol dm^{-3})	10^3 [aryloximes]$_o$ (mol dm^{-3})	$10^4 k'$ (s^{-1})				
		- OH	-OCH_3	-H	-Br	-NO_2
0.4	2.0	9.74	8.93	7.19	4.56	3.82
0.9	2.0	9.76	8.97	7.15	4.54	3.87
1.8	2.0	9.75	8.95	7.18	4.52	3.85
2.5	2.0	9.72	8.94	7.16	4.53	3.86
3.6	2.0	9.73	8.96	7.14	4.50	3.83
1.8	0.5	3.73	3.24	3.01	1.84	1.59
1.8	1.0	6.82	5.31	4.81	3.48	2.17
1.8	2.0	9.75	8.95	7.18	4.52	3.85
1.8	3.0	11.8	10.3	8.89	7.80	4.74
1.8	4.0	15.1	13.9	12.4	9.99	6.28

[$HClO_4$] = 1.6 × 10^{-4} mol dm^{-3}; [$RuCl_3$] = 16.0 × 10^{-6} mol dm^{-3} at 303 K.

Table 3. Effect of varying [$HClO_4$] and [$RuCl_3$] on the reaction rate at 303 K.

10^4 [$HClO_4$] (mol dm^{-3})	10^6[$RuCl_3$] (mol dm^{-3})	$10^4 k'$ (s^{-1})				
		- OH	-OCH_3	-H	-Br	-NO_2
0.4	16.0	15.1	14.2	12.5	8.84	7.43
0.8	16.0	12.5	10.4	9.43	6.45	5.14
1.6	16.0	9.75	8.95	7.18	4.52	3.85
2.4	16.0	7.95	6.14	5.45	3.60	2.80
3.2	16.0	5.90	5.10	4.70	3.10	2.30
16.0	4.0	5.12	4.45	2.59	2.55	1.82
16.0	8.0	7.43	6.72	4.85	3.63	2.94
16.0	16.0	9.75	8.95	7.18	4.52	3.85
16.0	24.0	12.1	11.7	11.3	5.65	4.59
16.0	32.0	15.5	14.4	12.6	6.40	5.20

[BAB] = 1.8 × 10^{-4} mol dm^{-3}; [aryloximes] = 2.0× 10^{-3}mol dm^{-3} at 303 K.

Table 4. Effect of varying temperature on the reaction rate and activation parameters for the oxidation of aryloximes by BAB in presence and absence of $RuCl_3$.

Temperature (K)	$k^{/} \times 10^4$/ s^{-1}				
	-OH	$-OCH_3$	-H	-Br	$-NO_2$
293	4.42 (0.96)	4.14(0.87)	3.62(0.70)	2.25(0.43)	1.49(0.35)
298	6.92(1.35)	6.12(1.35)	5.41(1.04)	3.28(0.63)	2.47(0.49)
303	9.75(1.76)	8.95(1.76)	7.18(1.38)	4.52(0.85)	3.85(0.72)
308	12.9(2.72)	12.6(2.72)	10.4(2.07)	7.20(1.26)	6.26(1.08)
313	18.2(3.51)	17.5(3.51)	14.9(2.76)	9.34(1.74)	8.51(1.48)
E_a(kJ mol^{-1})	35.2(53.6)	42.5(53.6)	46.7(55.9)	53.0(59.7)	56.5(64.2)
$\Delta H^{\neq}$ (kJ mol^{-1})	32.7(51.1)	39.9(51.1)	44.2(53.4)	50.5(57.1)	53.9(61.6)
$\Delta G^{\neq}$ (kJ mol^{-1})	91.8(96)	92.0(96.0)	92.4(96.6)	93.6(97.8)	94.1(97.0)
$\Delta S^{\neq}$ ($JK^{-1}mol^{-1}$)	-195(-148)	-171(-148)	-159(-142)	-142(-133)	-132(-120)

[BAB] = 1.80×10^{-4} mol dm^{-3}; [aryloximes] = 2.0×10^{-3}mol dm^{-3}; [$HClO_4$] = 1.6×10^{-4} mol dm^{-3}; [$RuCl_3$] = 16.0×10^{-6} mol dm^{-3}. Values in parentheses refer to the reaction in absence of $RuCl_3$ catalyst. Experimental conditions are same as above without $RuCl_3$ catalyst.

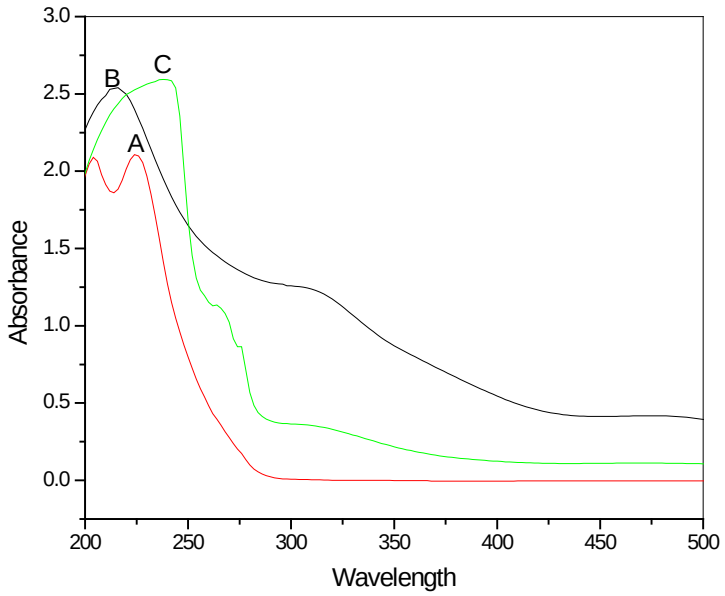


Fig. 1. UV-visible spectra of (A) $RuCl_3$, (B) BAB, (C) Mixture of $RuCl_3$ and BAB in $HClO_4$ medium.

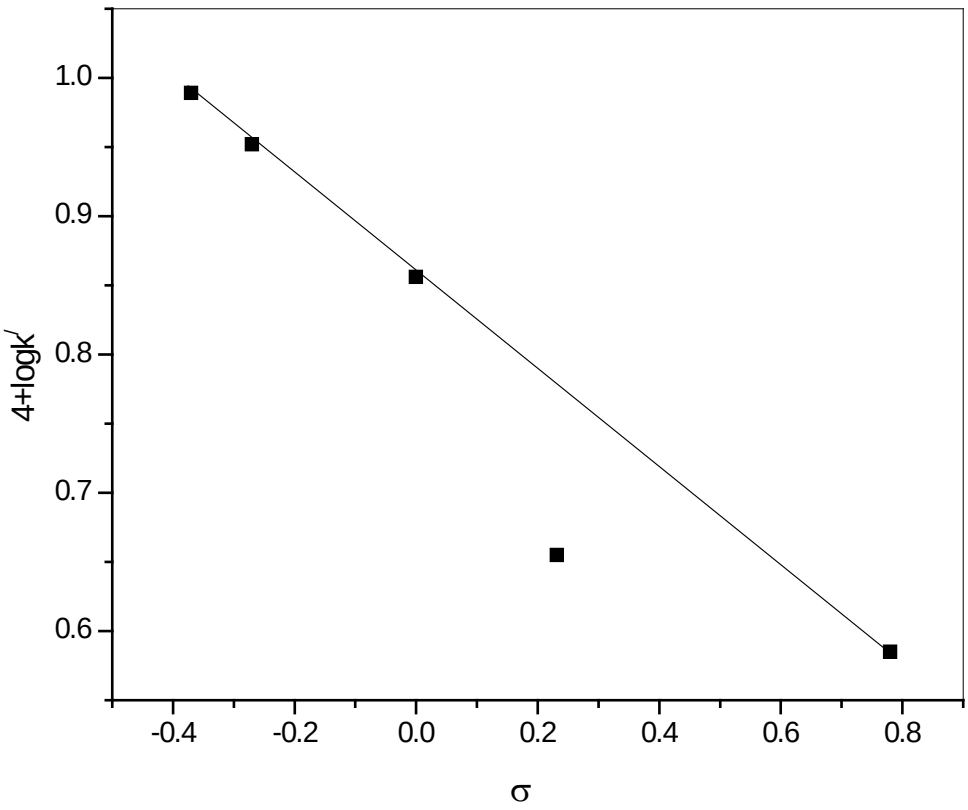


Fig. 2. Hammett plot of log $k^{/}$ versus σ.

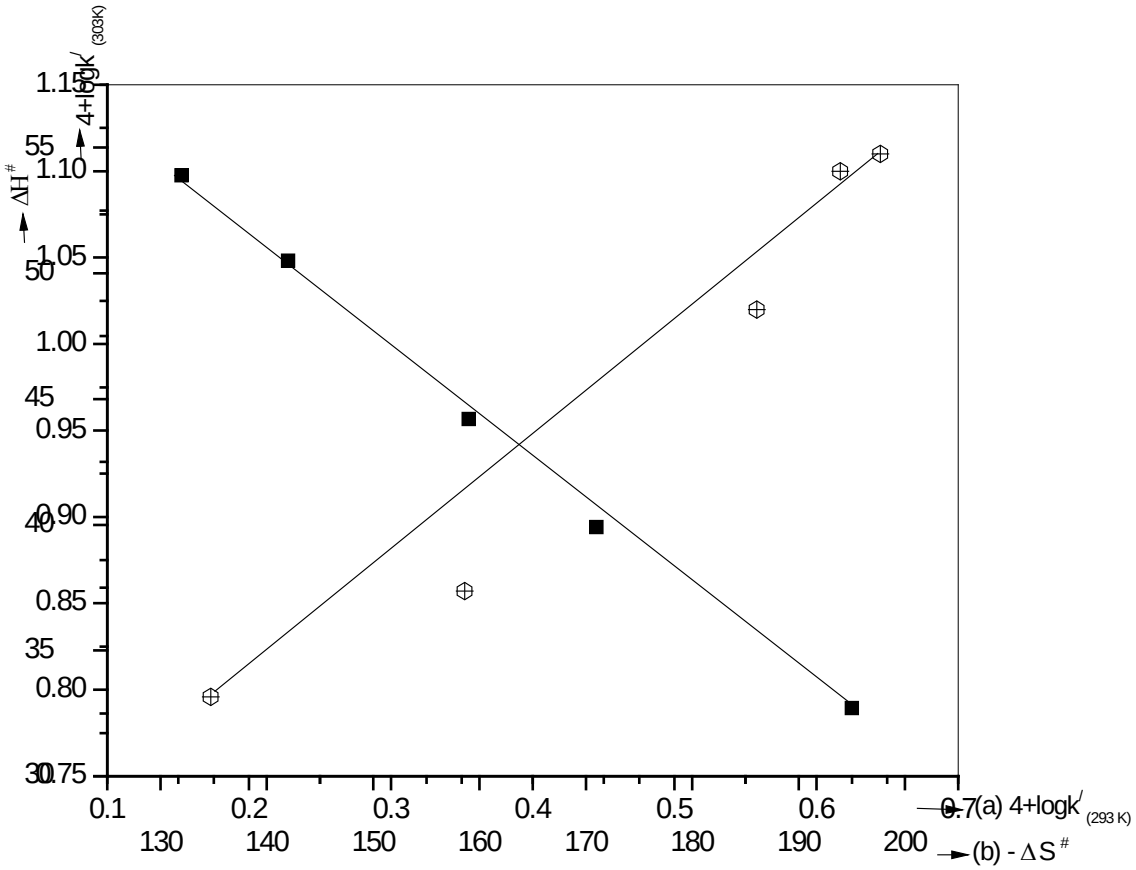
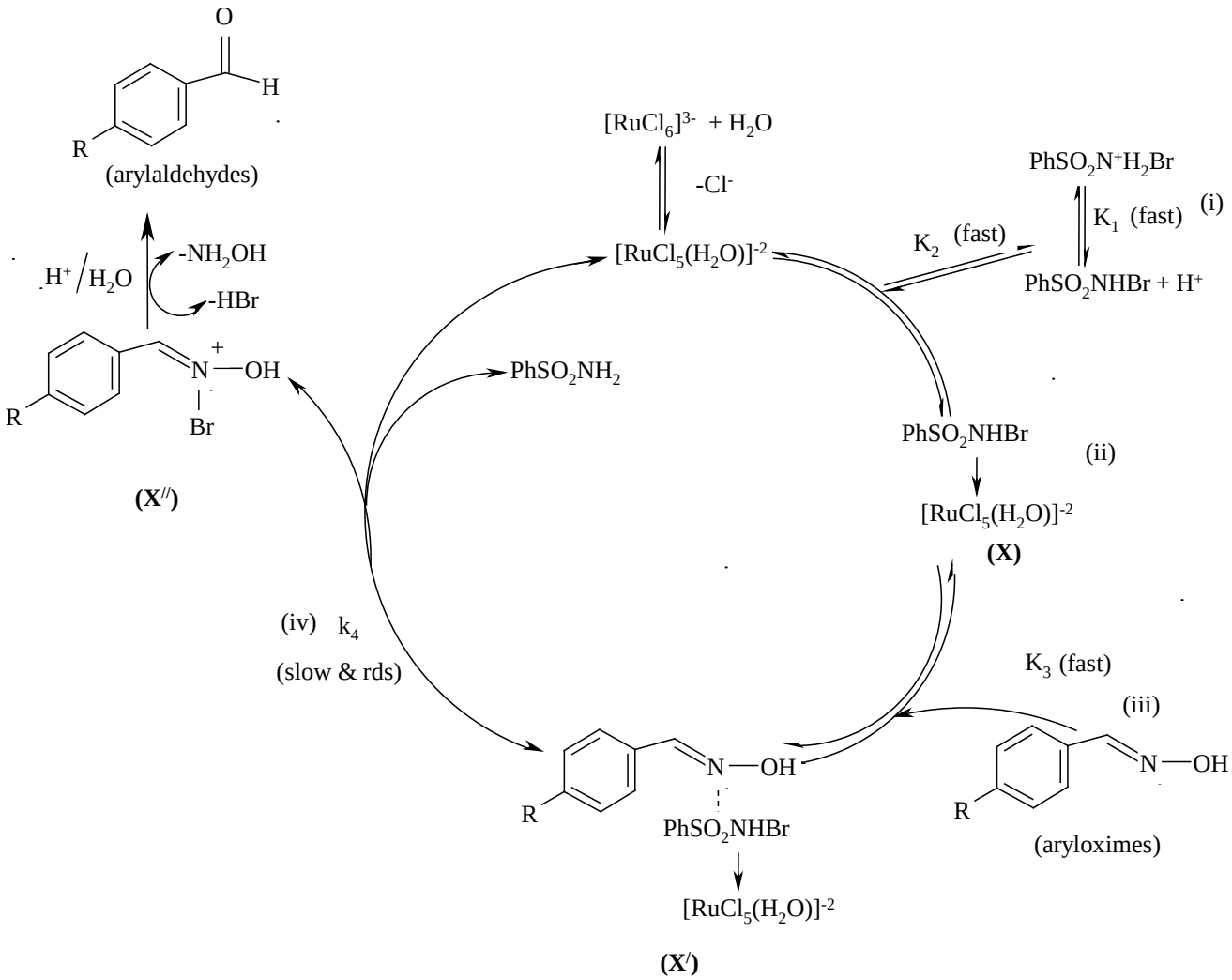


Fig. 3. Isokinetic plots of (a). log $k^{/}_{(293K)}$ versus log $k^{/}_{(303K)}$ (b). $\Delta H^{\#}$ versus $\Delta S^{\#}$.



Scheme 2. A detailed proposed mechanism for $RuCl_3$ catalyzed oxidative conversion of aryloximes to arylaldehydes with BAB in acid medium.