

Electronic Supplementary Information

Pt Nanoparticles Tethered DNA Assemblies for Enhanced Catalysis and SERS Applications

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This file contains pages from **S1** to **S18** where 48 figures and 4 tables corresponding to Pt-DNA assemblies for catalysis and SERS have been provided.

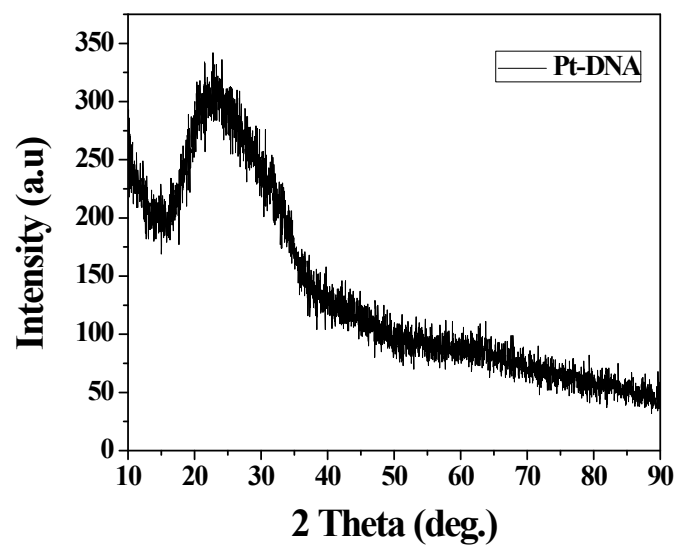


Figure S1: X-ray diffraction analysis of the Pt tethered DNA assemblies.

S. No	Volume of 10^{-2} M PtCl ₄ Solution (mL)	Volume of DNA solution (mL)	Volume of 0.1 M NaBH ₄ solution (mL)	Colour
1.	1	3	4	Light brown
2.	2	3	4	Dark Brown
3.	3	3	4	Light black
4.	4	3	4	Dark black

Table S1: Molar ratios used and the observed color changes in Pt NPs tethered DNA assemblies.

S. No	Test solution	Volume of Test solution (μL)	Volume of Water (mL)	Volume of 10^{-2} M NaBH₄ solution (mL)	Volume of Pt NPs (μL)
1.	2-Nitro phenol	100	5	1	25
2.	4-Nitrophenol	25	5	1	25
3.	2-Nitro aniline	100	5	1	25
4.	4-Nitro aniline	600	5	1	25
5.	4-Nitro benzaldehyde	400	5	1	25
6.	2-Bromo-5-Nitro aniline	100	5	1	25

Table S2: Concentration of nitro compounds and NaBH₄ used with Pt NPs tethered DNA assemblies for the reduction.

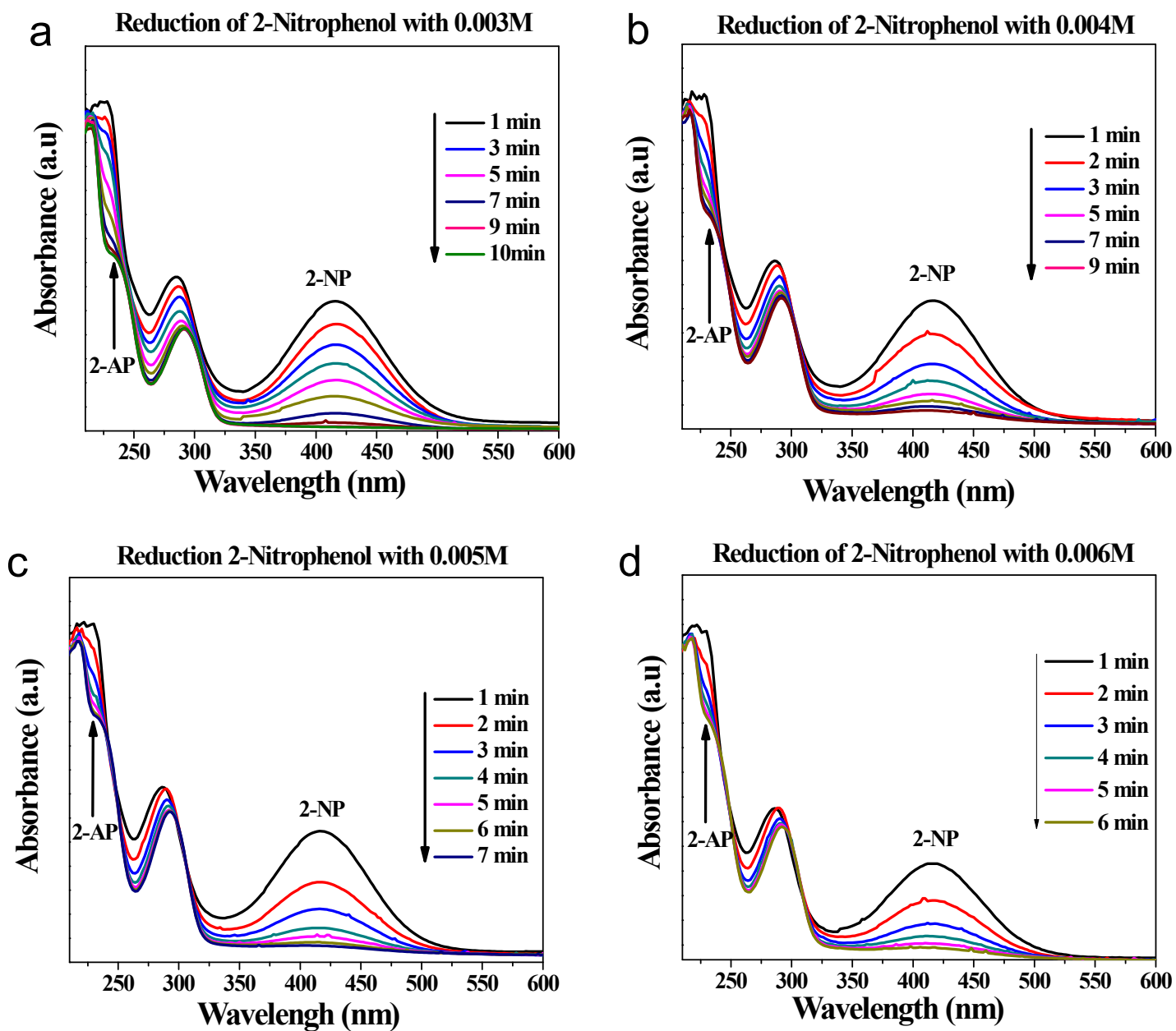


Figure S2: (a-d) are the reduction of 2-nitrophenol to 2-aminophenol.

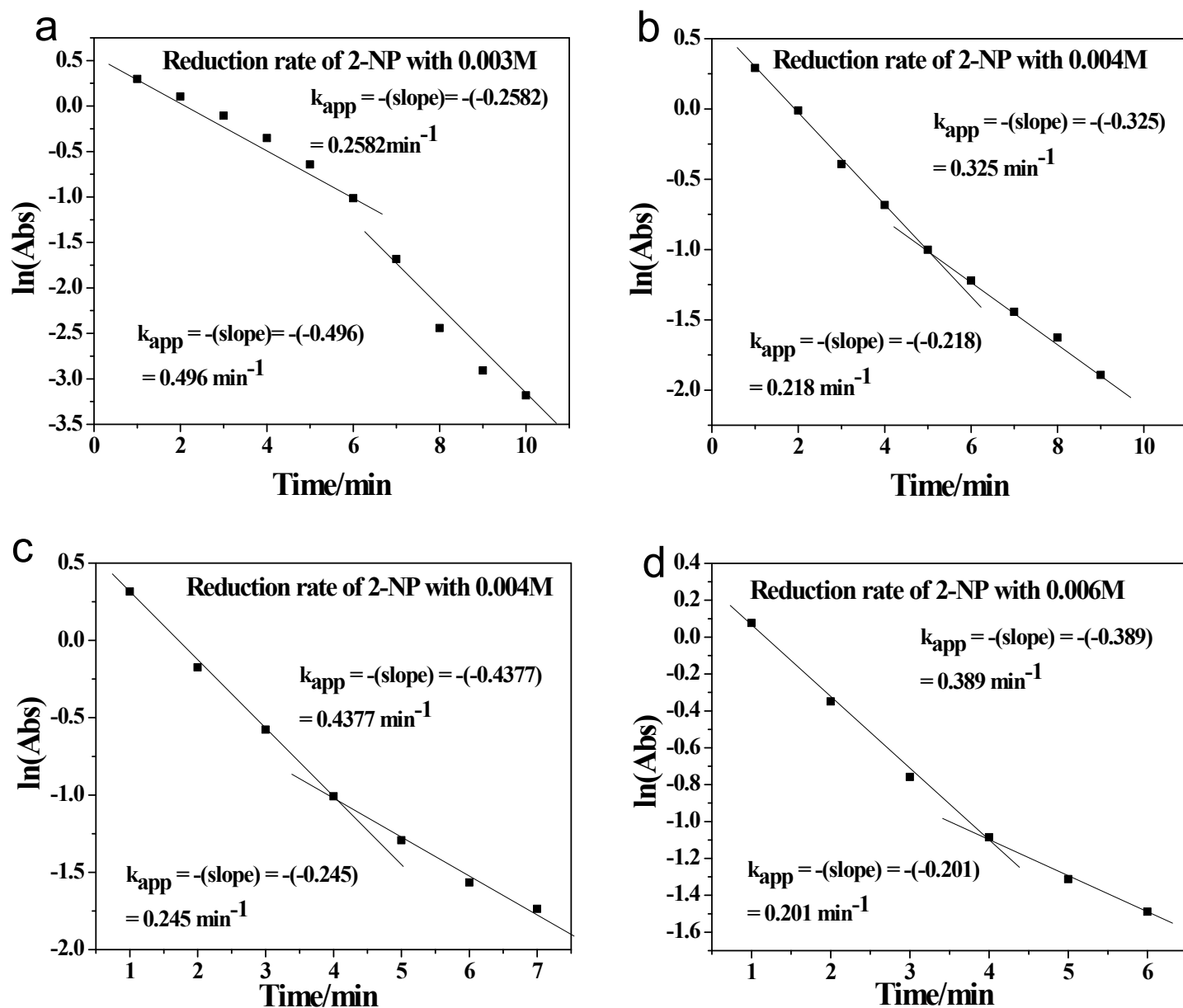


Figure S3: (a-d) Rate constants for the reduction of 2-nitrophenol to 2-aminophenol.

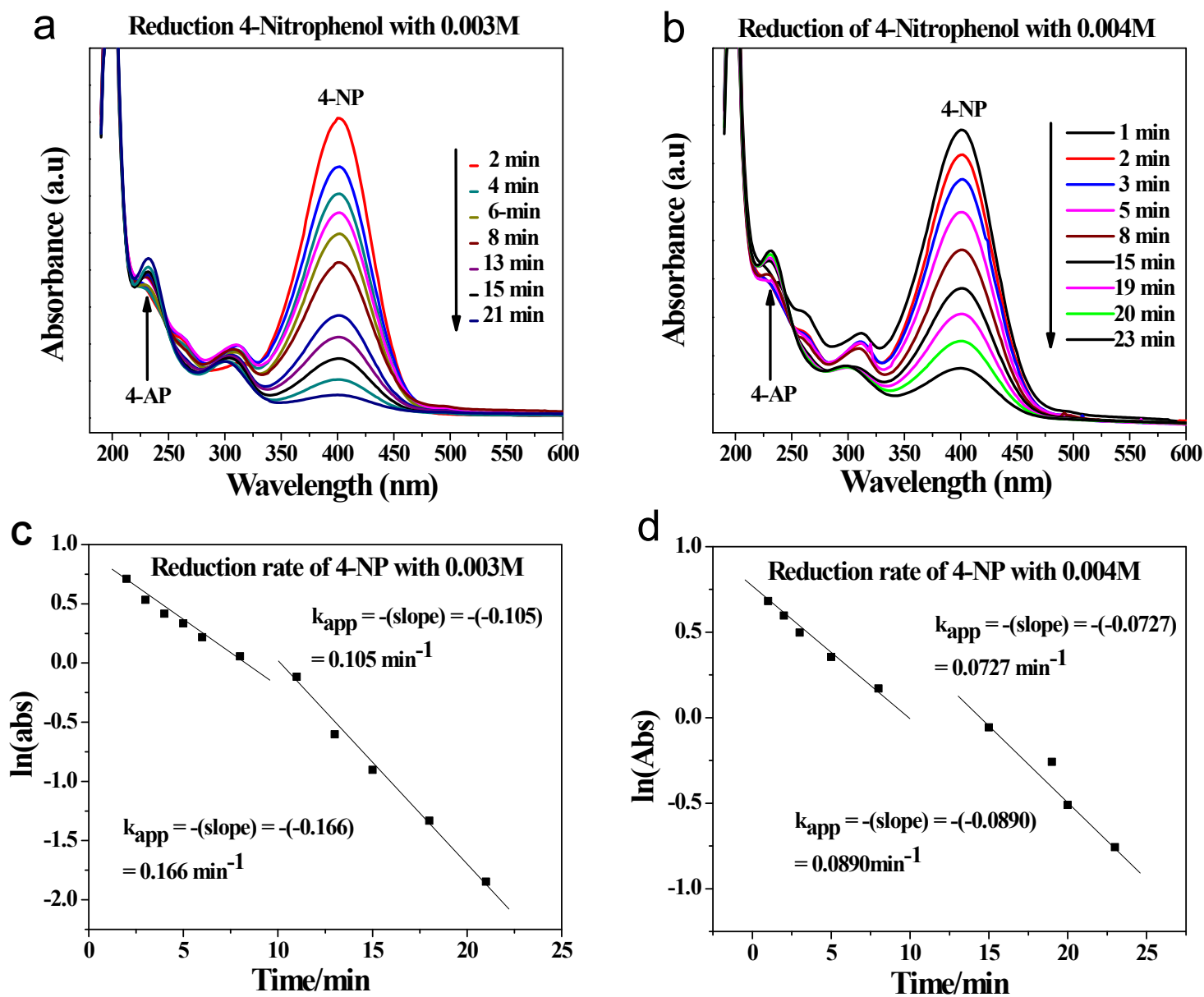


Figure S4: (a-b) Time dependent reduction of 4-nitrophenol using catalyst 1 and 2 and (c-d) are the corresponding rate constants for the reduction of 4-nitrophenol to 4-aminophenol.

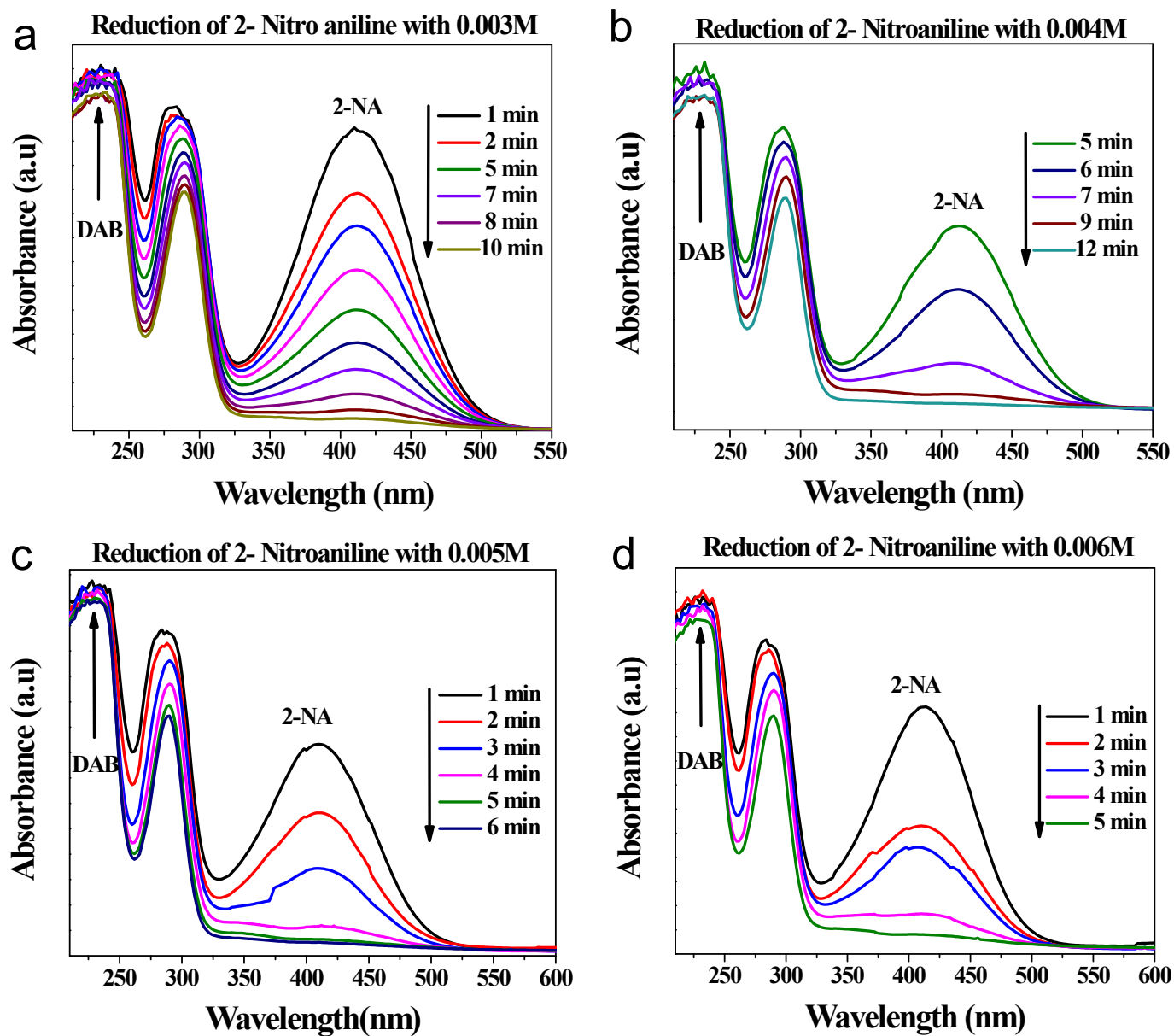


Figure S5: (a-d) are the reduction of 2-nitroaniline to diamino benzene.

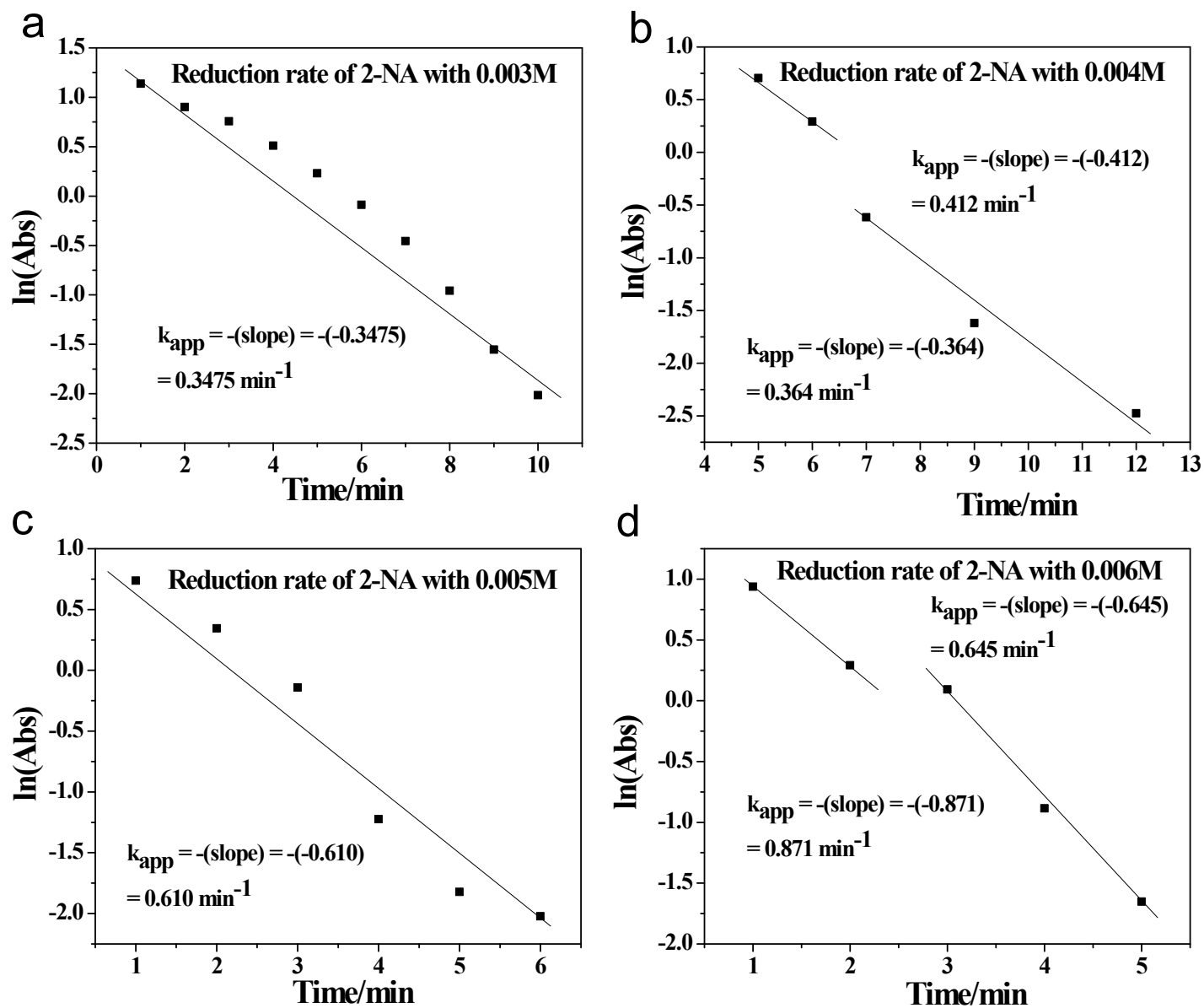


Figure S6: (a-d) are the corresponding rate constants for the reduction of 2-nitroaniline to diamino benzene.

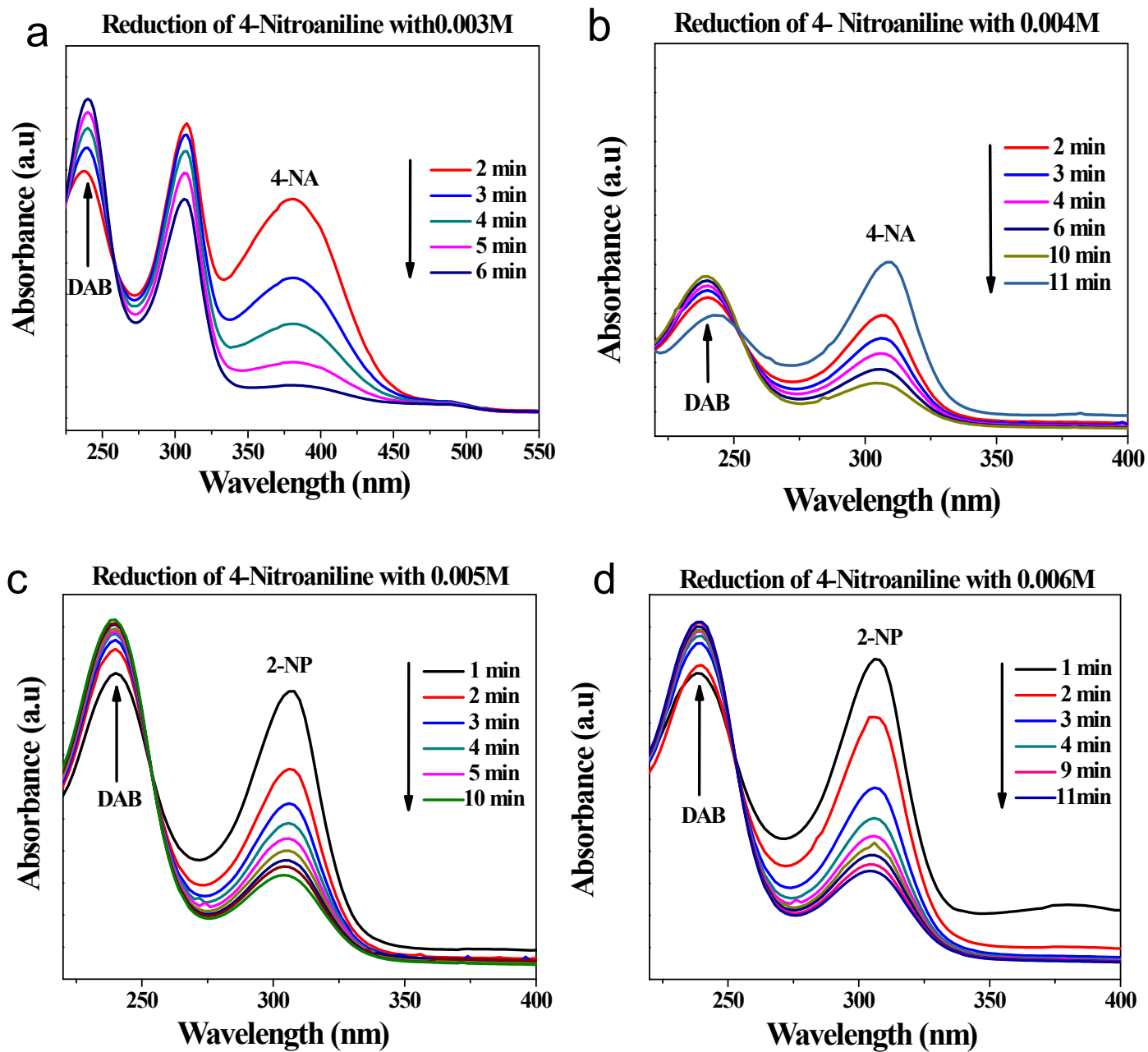


Figure S7: (a-d) are the reduction of 4-nitroaniline to diamino benzene.

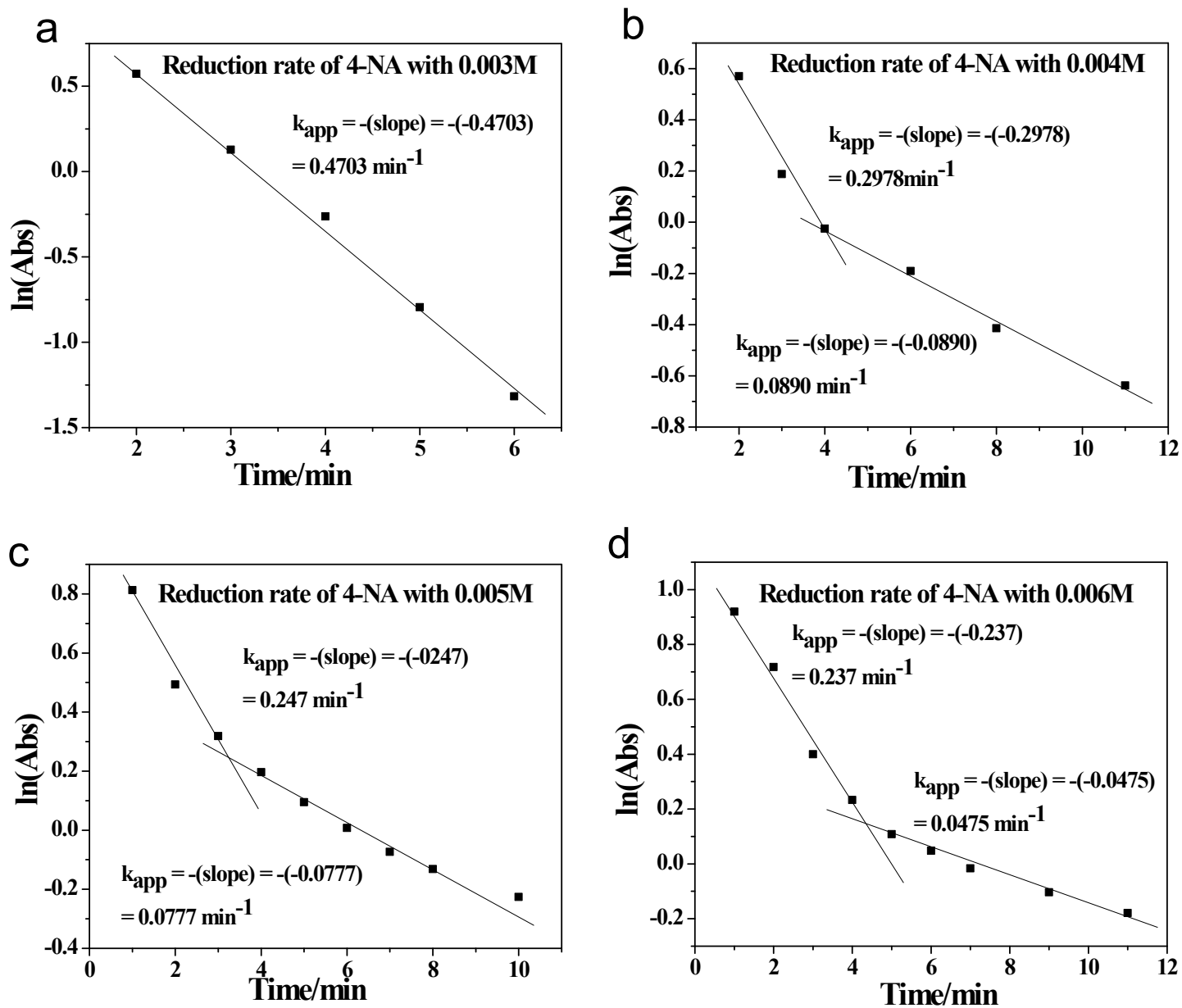


Figure S8: (a-d) are the corresponding rate constants for the reduction of 4-nitroaniline to diamino benzene.

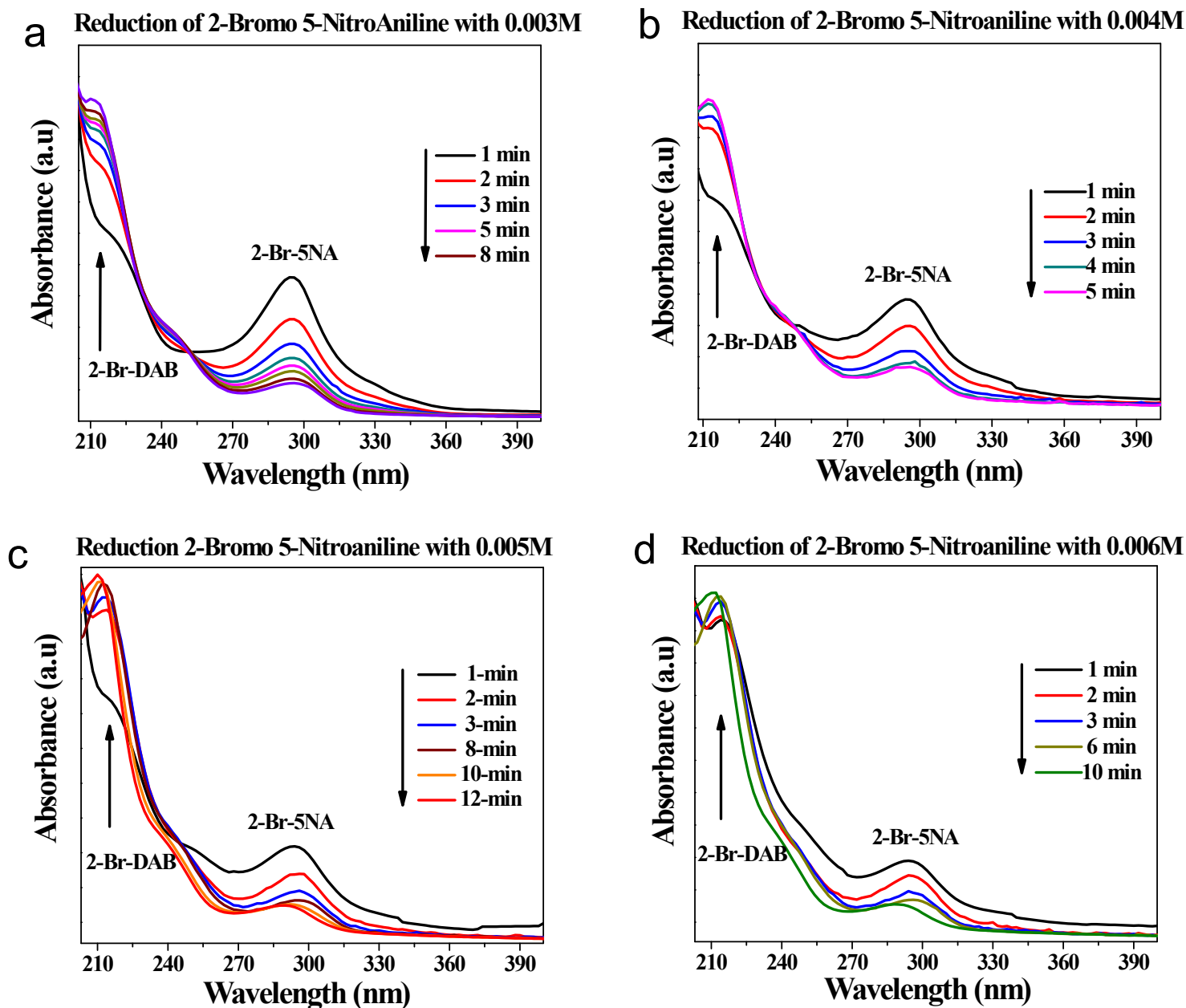


Figure S9: (a-d) are the reduction of 2-bromo-5-nitro aniline to 2-bromo diamino benzene.

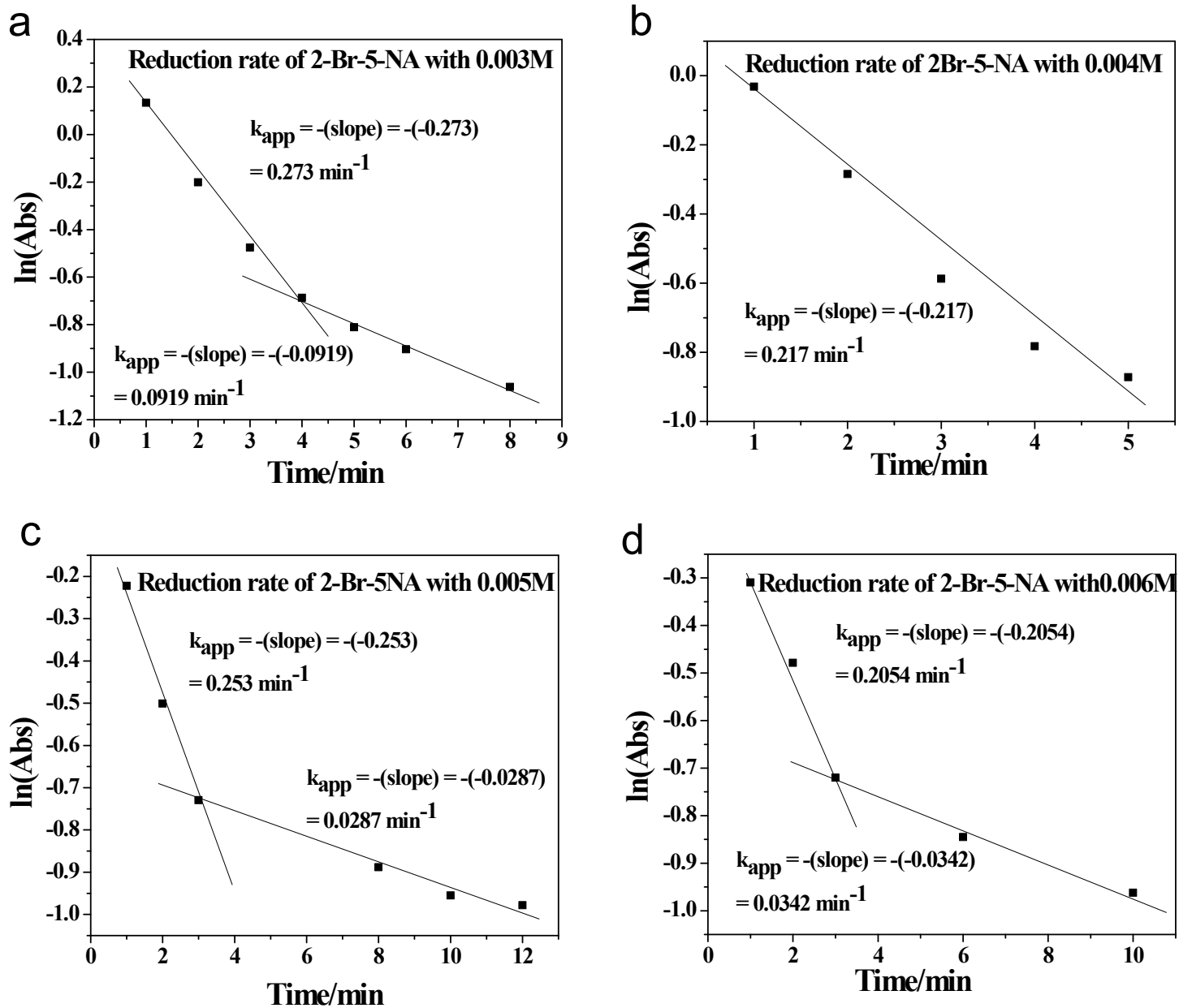


Figure S10: (a-d) are the corresponding rate constants for the reduction of 2-bromo-5-nitroaniline to 2-bromo diamino benzene.

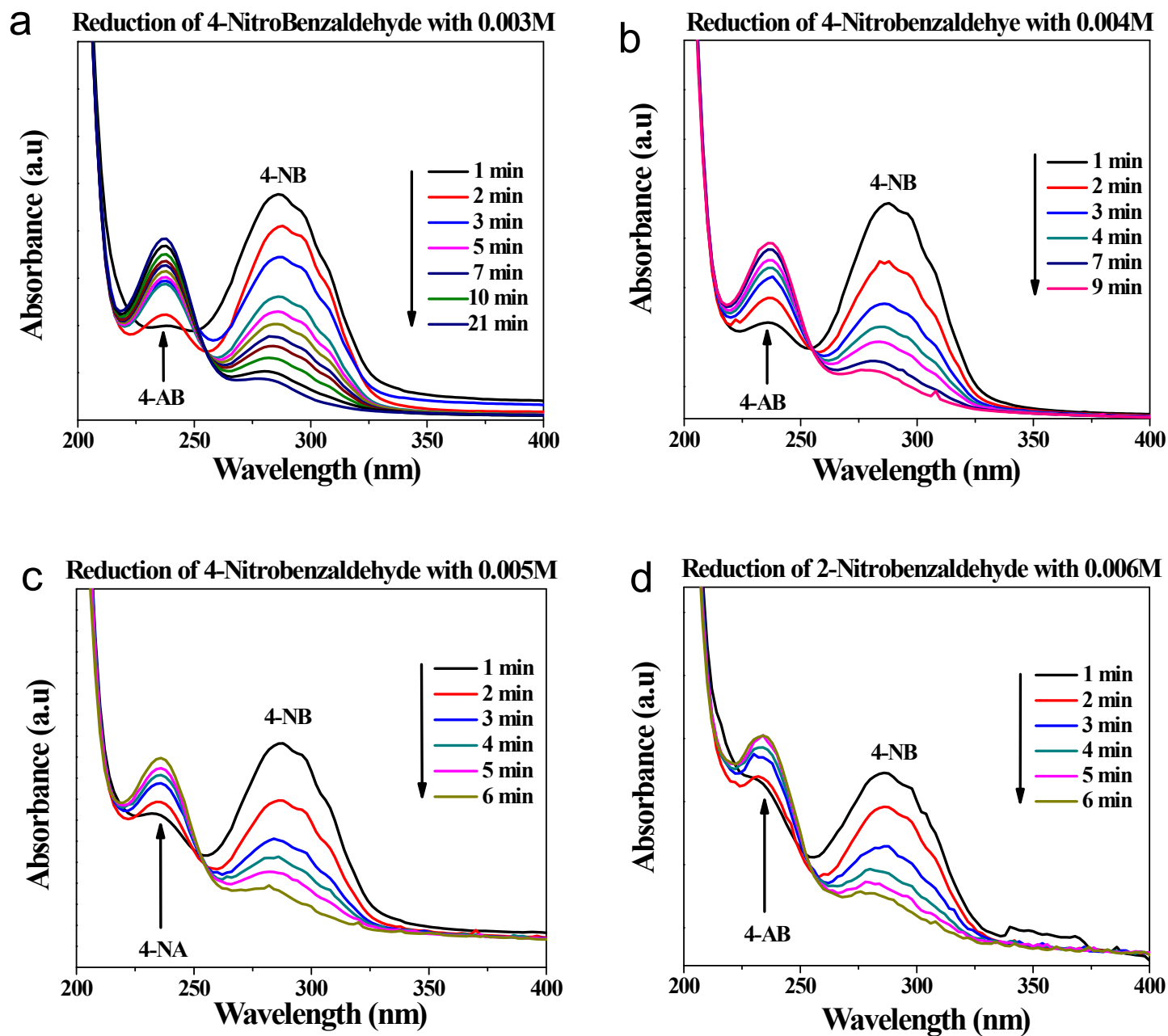


Figure S11: (a-d) are the reduction of 4-nitrobenzaldehyde to 4-aminobenzaldehyde.

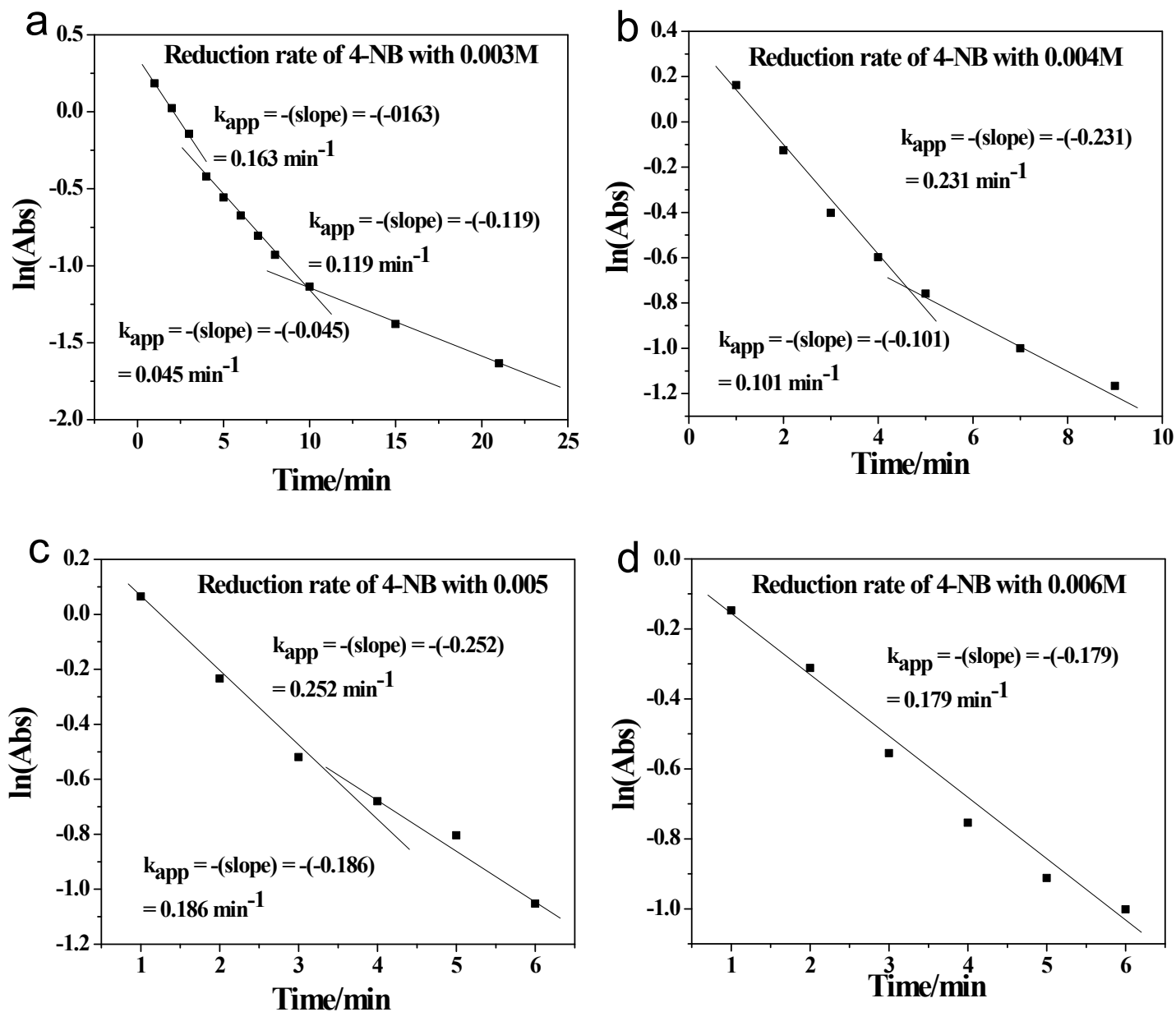


Figure S12: (a-d) are the corresponding rate constants for the reduction of 4-nitrobenzaldehyde to 4-aminobenzaldehyde.

Serial	Test solution	Catalyst	Time (min)	Conversion (%)	Selectivity (%)	Yield (%)	Rate constant of the rate determining step k (min ⁻¹)
1.	2-NP	0.003M	10	96.3	100	96.3	2.582×10 ⁻¹
		0.004M	9	85.5	100	85.5	2.18×10 ⁻¹
		0.005M	7	87.0	100	87.0	2.45×10 ⁻¹
		0.006M	6	79.2	100	79.2	2.01×10 ⁻¹
2.	4-NP	0.003M	21	92.3	100	92.3	1.05×10 ⁻¹
		0.004M	23	78.1	100	78.1	0.727×10 ⁻¹
		0.005M	30	84.2	100	84.2	0.639×10 ⁻¹
		0.006M	28	86.1	100	86.1	0.744×10 ⁻¹
3.	2-NA	0.003M	10	96.1	100	96.1	3.475×10 ⁻¹
		0.004M	12	94.7	100	94.7	3.64×10 ⁻¹
		0.005M	6	93.5	100	93.5	6.10×10 ⁻¹
		0.006M	5	91.8	100	91.8	6.45×10 ⁻¹
4.	4-NA	0.003M	6	84.4	100	84.4	4.703×10 ⁻¹
		0.004M	11	70.3	100	70.3	0.890×10 ⁻¹
		0.005M	10	64.7	100	64.7	0.777×10 ⁻¹
		0.006M	11	67.1	100	67.1	0.475×10 ⁻¹
5.	4-NB	0.003M	21	82.9	100	82.9	0.45×10 ⁻¹
		0.004M	9	73.6	100	73.6	1.01×10 ⁻¹
		0.005M	6	66.2	100	66.2	1.86×10 ⁻¹
		0.006M	6	57.9	100	57.9	1.79×10 ⁻¹
6.	2-Br-5-NA	0.003M	8	74.2	100	74.2	0.919×10 ⁻¹
		0.004M	5	56.4	100	56.4	2.17×10 ⁻¹
		0.005M	12	56.1	100	56.1	0.287×10 ⁻¹
		0.006M	10	50.1	100	50.1	0.342×10 ⁻¹

Table S3: Observed Selectivity, yield, conversion and corresponding rate constants for the reduction of nitro compounds.

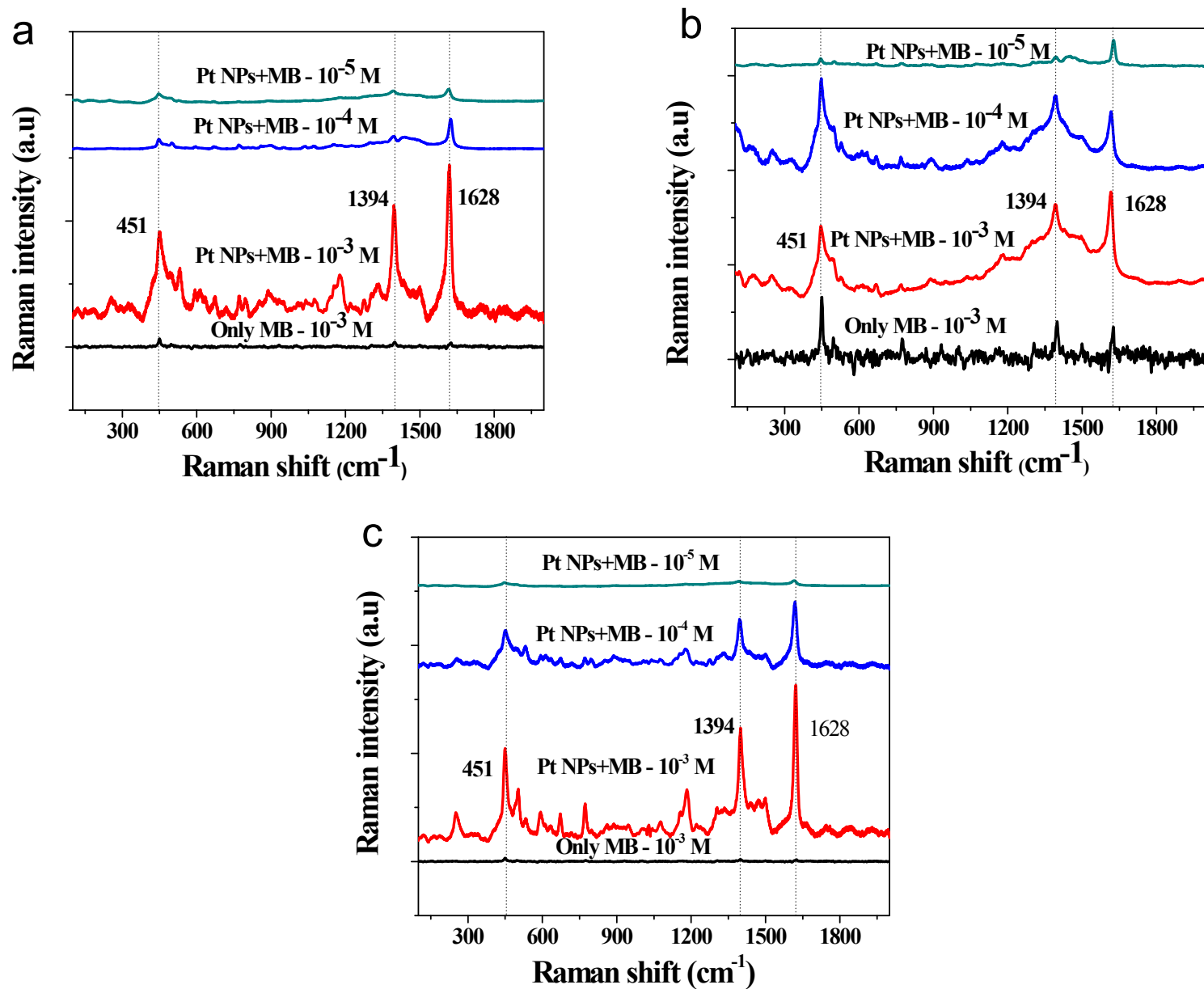


Figure S13: (a-c) SERS enhancements of Pt NPs tethered DNA assemblies with respect to MB with 0.004, 0.005 and 0.006M respectively.

S.No	Test solution	catalyst	EF		
			Peak @ 1628	Peak @ 1394	Peak @ 451
1.	10^{-3} M	0.003M	4.832×10^3	4.50×10^3	2.078×10^3
		0.004M	2.581×10^3	1.683×10^3	8.043×10^2
		0.005M	2.124×10^2	1.645×10^2	7.861×10^2
		0.006M	5.969×10^3	3.732×10^3	1.867×10^3
2.	10^{-4} M	0.003M	3.255×10^4	3.044×10^4	1.702×10^3
		0.004M	4.939×10^3	1.956×10^3	1.024×10^3
		0.005M	1.374×10^3	1.566×10^3	1.183×10^3
		0.006M	2.722×10^4	1.801×10^4	8.814×10^3
3.	10^{-5} M	0.003M	2.525×10^5	1.531×10^5	7.174×10^4
		0.004M	2.469×10^4	1.775×10^4	8.992×10^3
		0.005M	6.589×10^3	2.533×10^3	1.399×10^3
		0.006M	3.665×10^4	2.583×10^4	1.272×10^4

Table S4: Enhancement factors (EF) observed with different molar ratios of MB like 10^{-3} , 10^{-4} and 10^{-5} .