

**Table.S1. Structural and textural properties of ZnO and ZnO/rGO nanocomposite.**

Catalysts	FWHM (°)	Grain size (nm)	a=b (Å)	c (Å)	Unit cell volume (Å <sup>3</sup> )
ZG0	0.301	34.70	3.25016	5.20536	47.62
ZG1	0.319	31.92	3.24918	5.20752	47.61
ZG2	0.325	31.59	3.24946	5.20645	47.61
ZG3	0.31	31.58	3.25048	5.20732	47.65
ZG4	0.337	29.05	3.24987	5.20705	47.63

**Table.S2 Characterization results for ZnO and ZnO/rGO nanocomposite**

Catalysts	Surface area (m <sup>2</sup> /g)	Pore volume (10 <sup>-3</sup> cm <sup>3</sup> /g)	Pore size (nm)	Partical size (μm)
ZG0	30.9	4.12	1.07	17.1
ZG1	39.3	4.19	1.28	14.0
ZG2	41.0	4.72	1.26	17.7
ZG3	25.4	4.14	1.26	16.2
ZG4	18.8	3.23	1.29	18.8

**Table.S3 Raman and EDX analysis for GO and ZnO/rGO nanocomposite.**

Catalysts	Raman	EDX		
	I <sub>D</sub> /I <sub>G</sub>	C (wt %)	C/O ratio	C/H ratio
GO	1.464	41.96	0.811	15.66
ZG1	1.545	54.83	1.307	23.69
ZG2	1.608	61.39	1.715	30.73
ZG3	1.659	63.52	1.853	36.13
ZG4	1.660	65.32	2.006	39.43

**Table.S4 Kinetic rate constant (k), regression coefficient (R<sup>2</sup>) and percentage degradation of dimethoate**

Catalysts	k (10 <sup>-3</sup> min <sup>-1</sup> )	R <sup>2</sup>	Degradation of dimethoate (%)
None	0.7	0.9969	11.6
ZG0	6.2	0.9953	66.3
ZG1	16.9	0.9901	95.3
ZG2	24.4	0.98	98.2
ZG3	15.9	0.9861	95.4
ZG4	5.5	0.9765	66.9

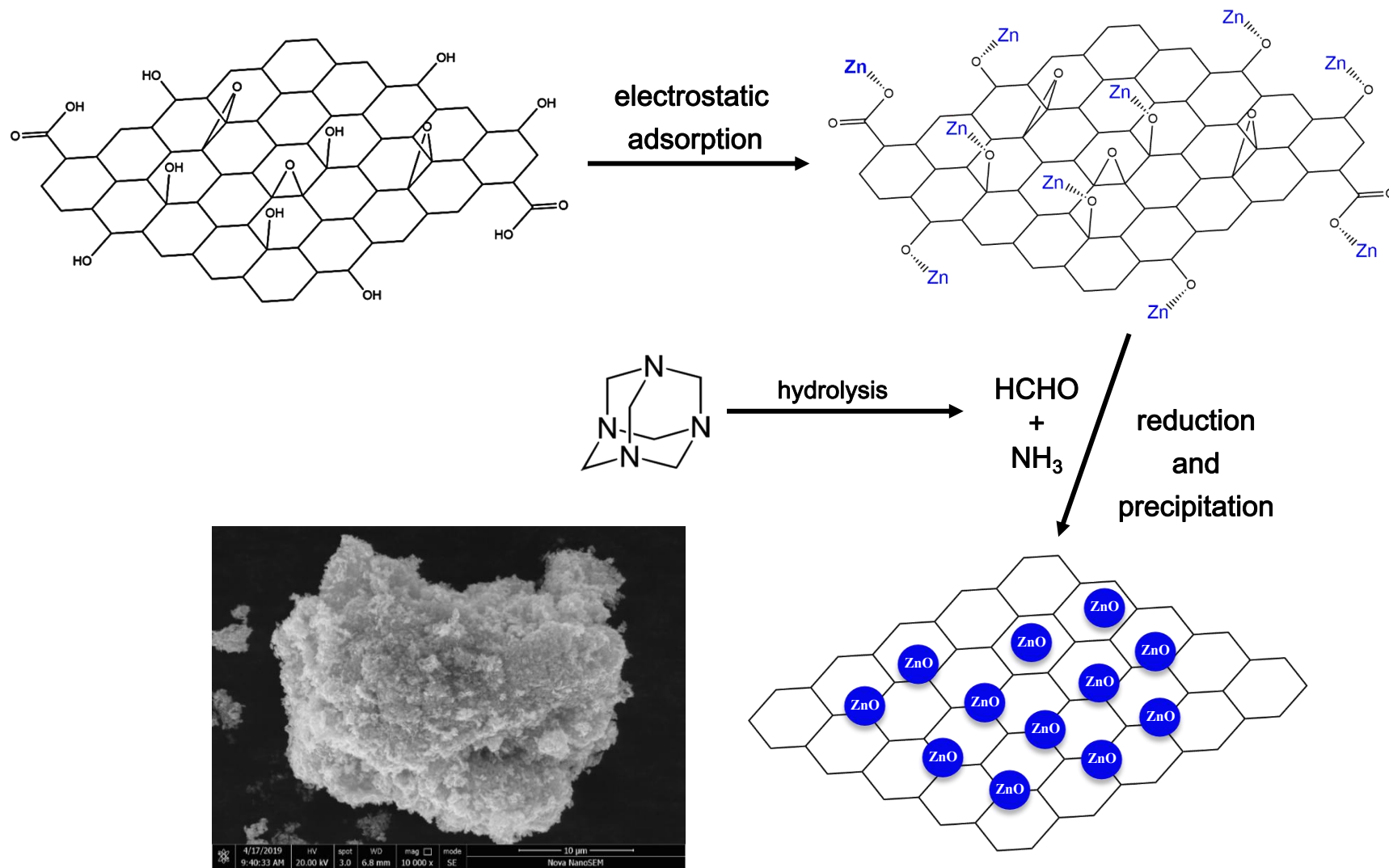


Fig. S1. Formation of ZnO/rGO composites

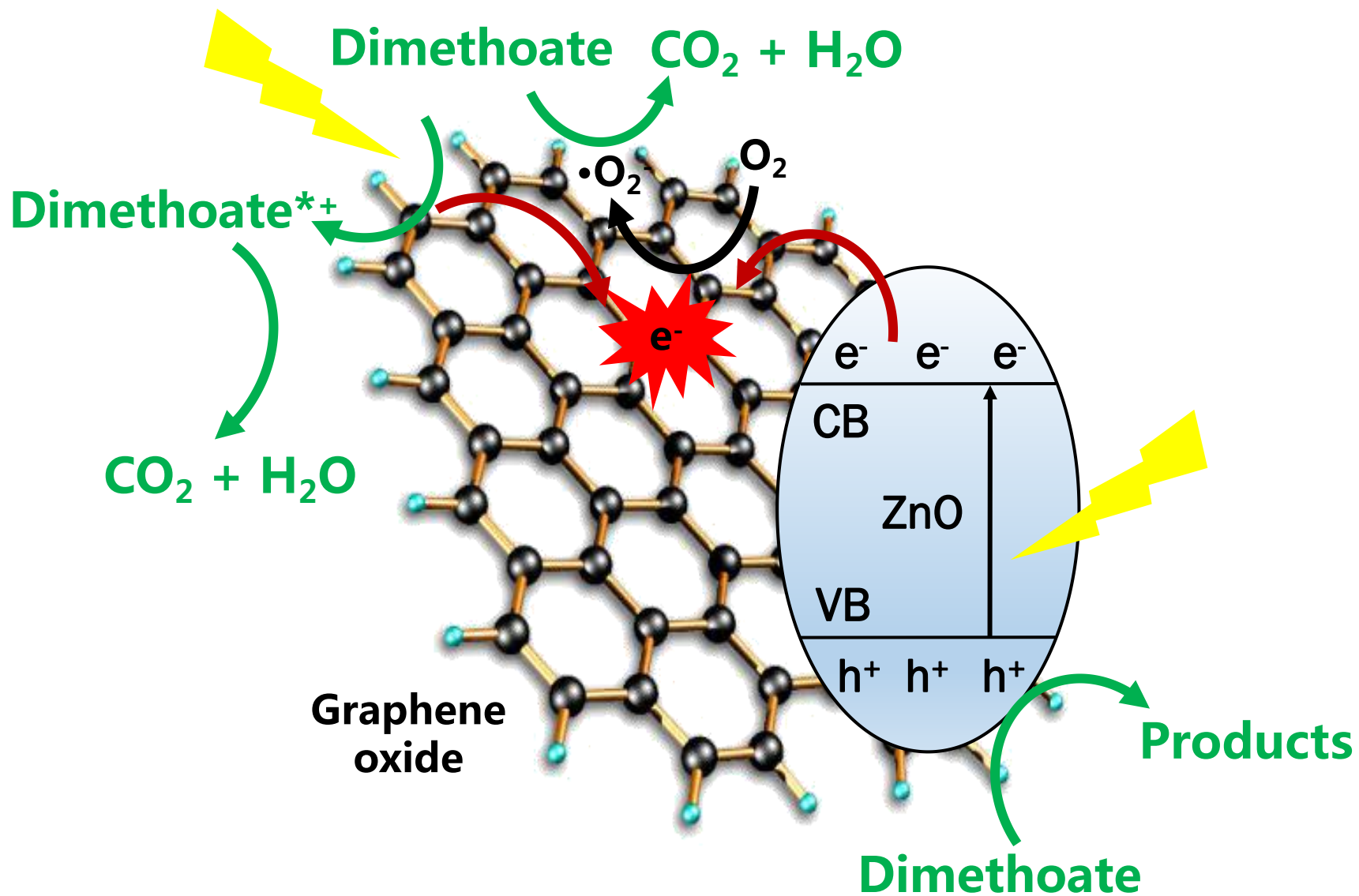
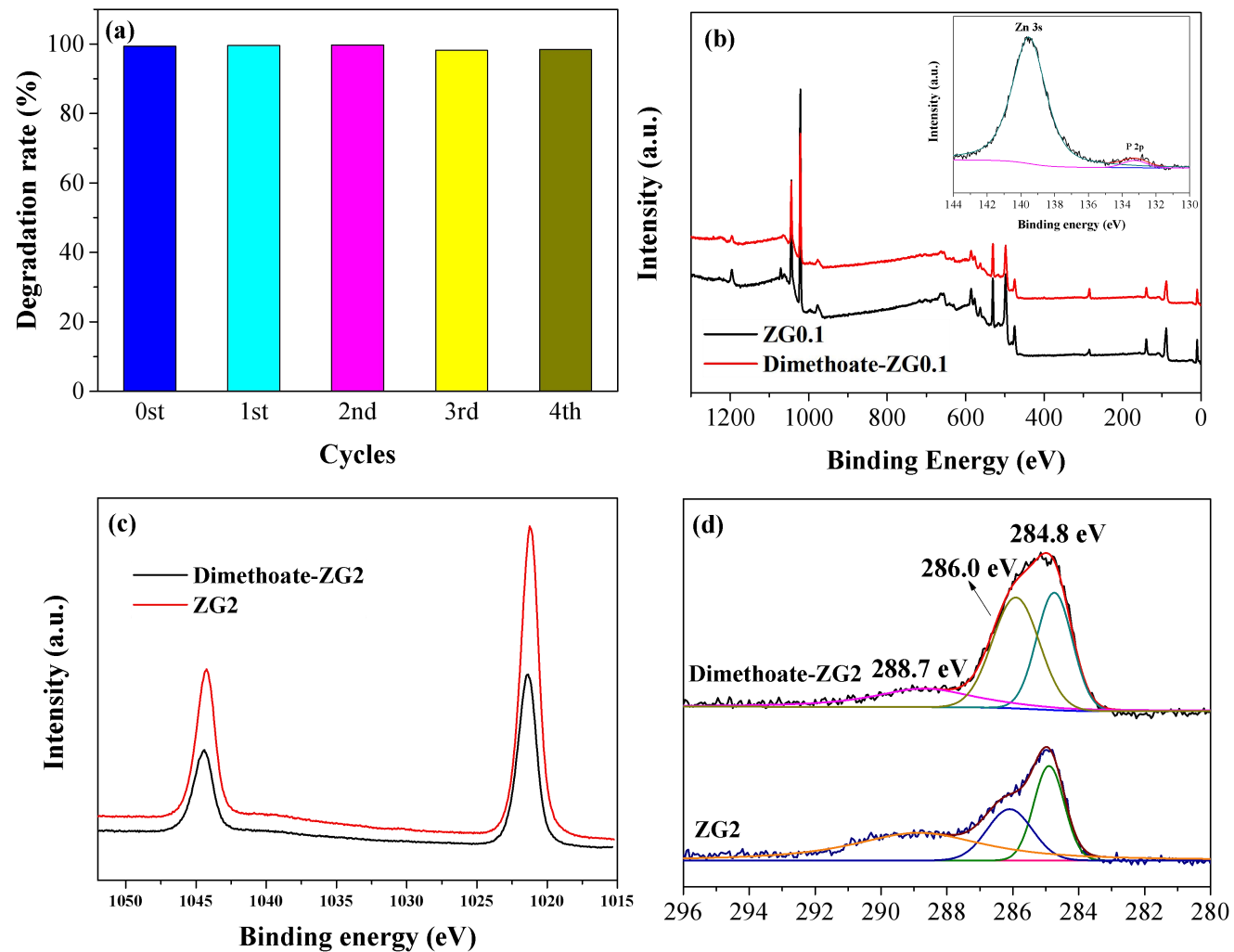


Fig. S2. Scheme of proposed mechanism for photocatalytic degradation of dimethoate on ZnO/rGO catalyst



**Fig. S3 (a) Reusability of ZG2 for the degradation of dimethoate. (b) XPS total survey spectra. (c) Zn 2p and (d) C 1s high-resolution XPS data of ZG2 and dimethoate-ZG2.**