Electronic Supplementary Information

Creation of facile heterojunction in Co/ZnO-TiO_2 for photocatalytic degradation of Alizarin S

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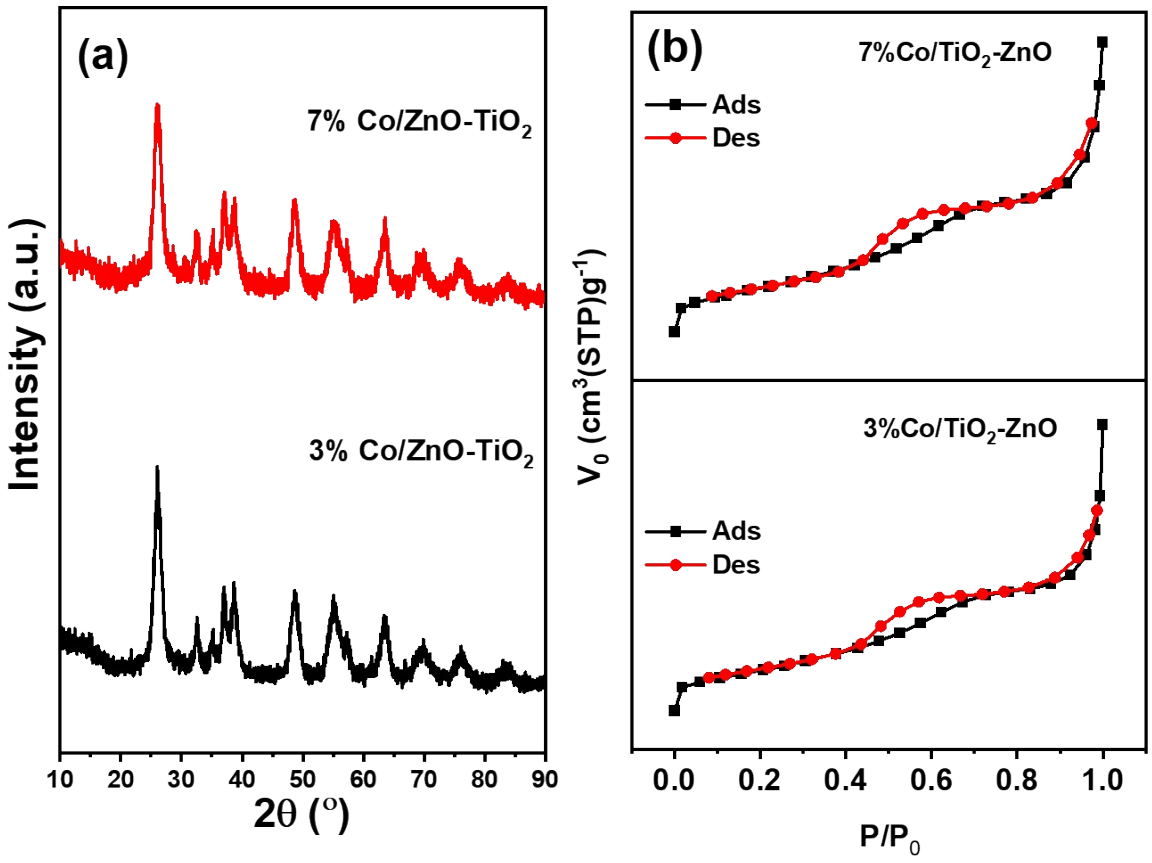

Fig. S1 (a) XRD pattern and (b) BET isotherm of 3% Co/ZnO-TiO_2 and 7% Co/ZnO-TiO_2

Table S1: Atomic percentage of elements from EDX and XRF for ZnO-TiO_2 and 5% Co/ ZnO-TiO_2

Catalyst	XRF			EDX		
	Zn	**Ti**	**Co**	**Zn**	**Ti**	**Co**
ZnO-TiO_2	26.06	73.9	-	30.0	89.01	-
3% Co/ZnO-TiO_2	32.8	65.7	1.5	36.8	61.2	2.0
5% Co/ZnO-TiO_2	35.93	60.7	3.8	35.9	60.6	3.5
7% Co/ZnO-TiO_2	37.3	57.5	5	34.9	59.2	5.9

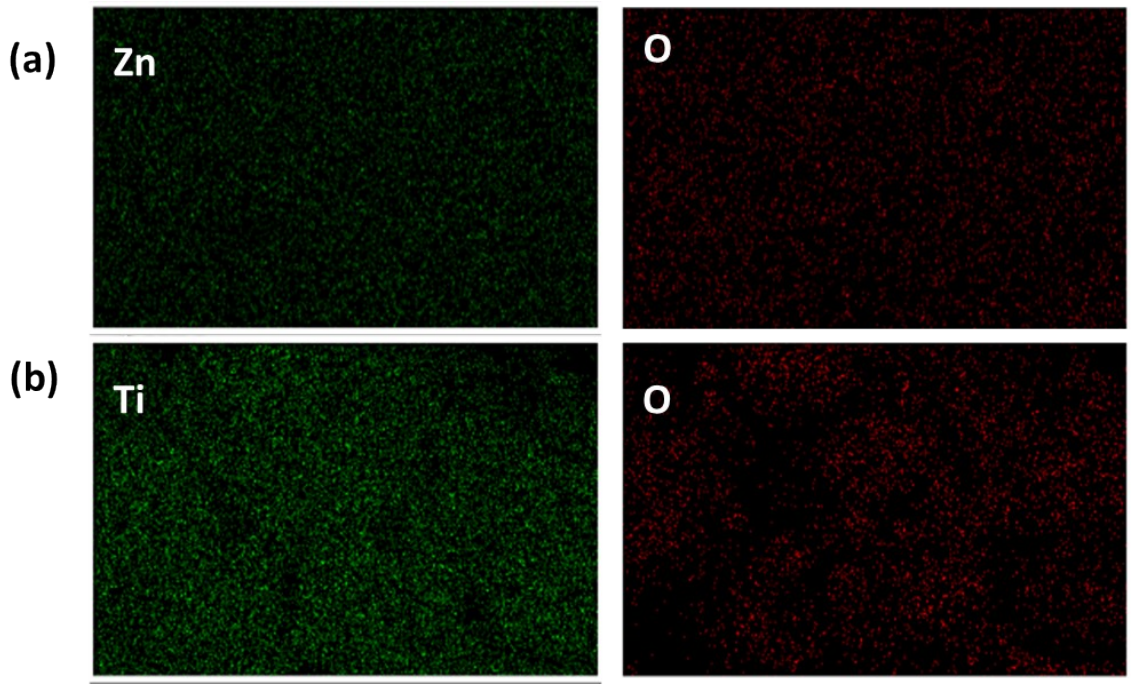

Fig. S2 EDX mapping of (a) ZnO (b) TiO_2

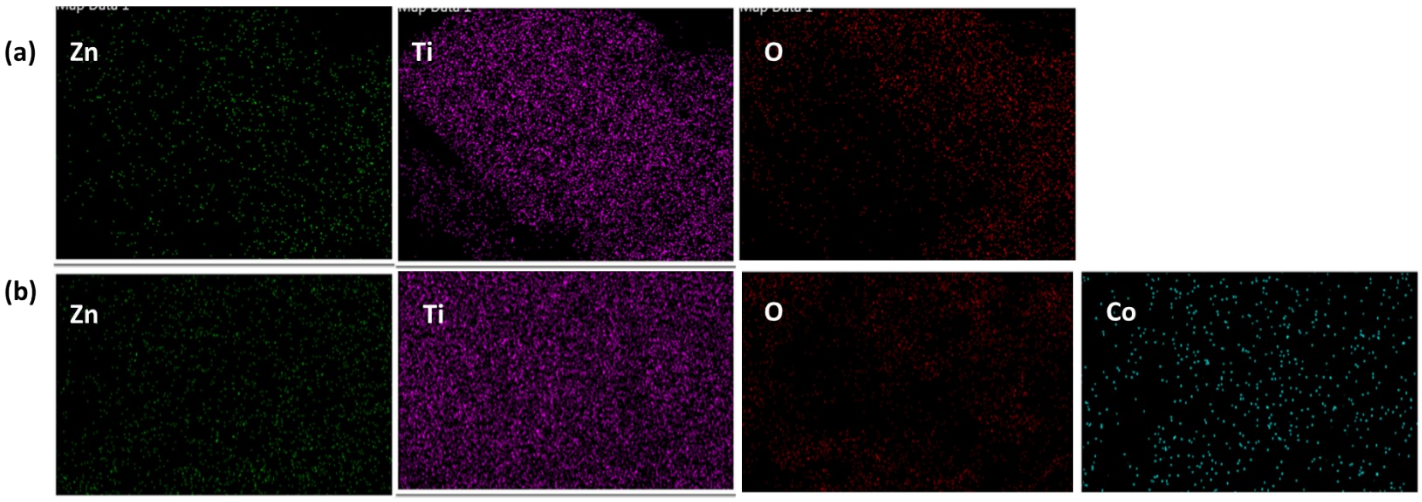

Fig. S3 EDX mapping of (a) ZnO -TiO_2 (b) 5% Co/ZnO-TiO_2

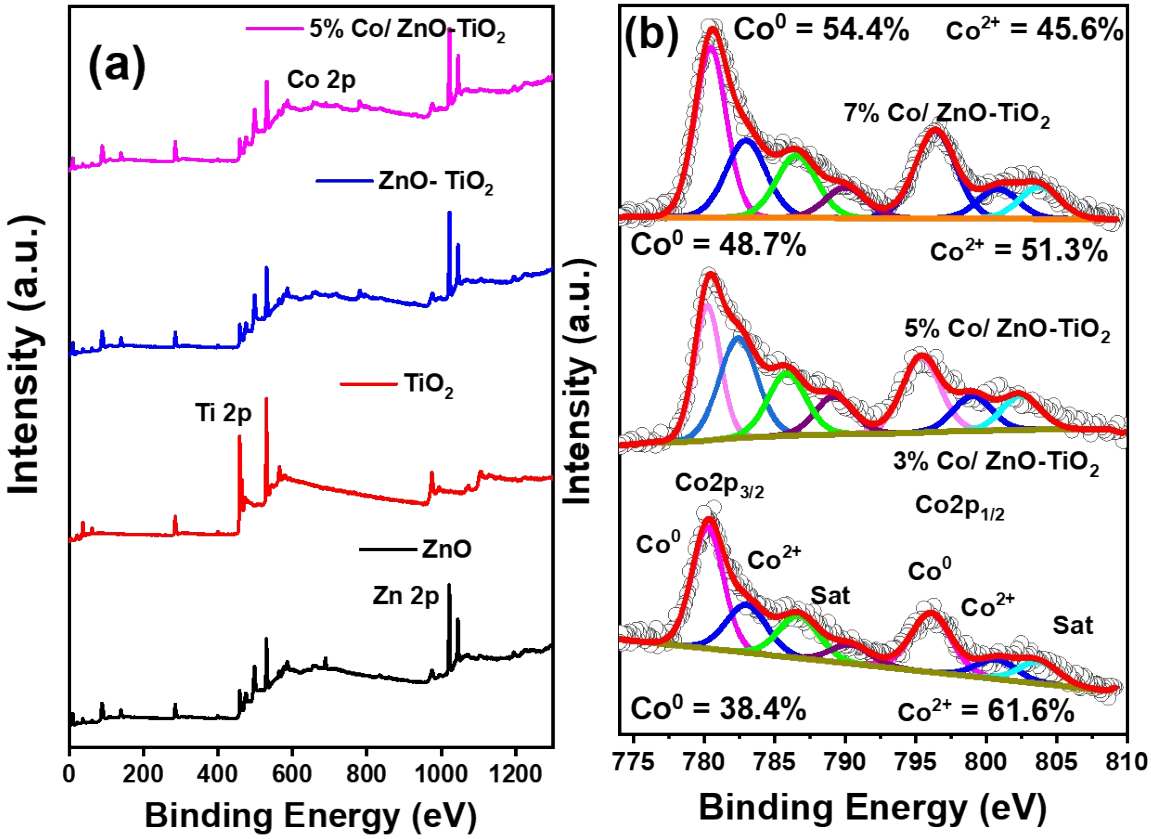

Fig. S4 (a) XPS survey spectra and (b) Co 2p core level spectra

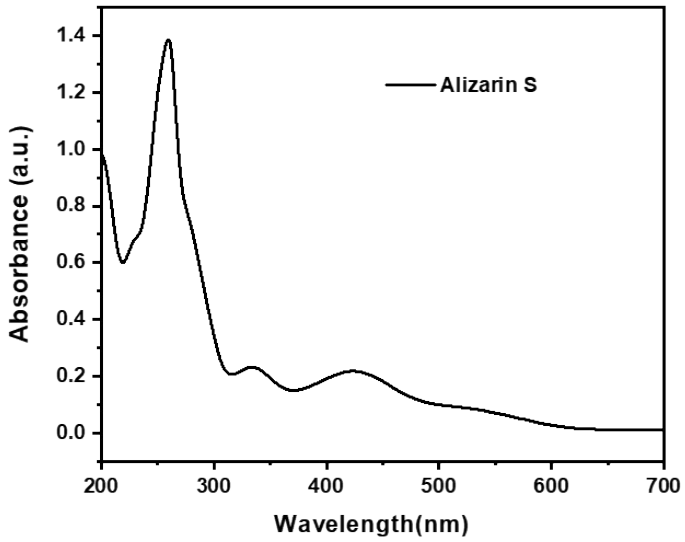

Fig. S5 UV-visible spectra of Alizarin S

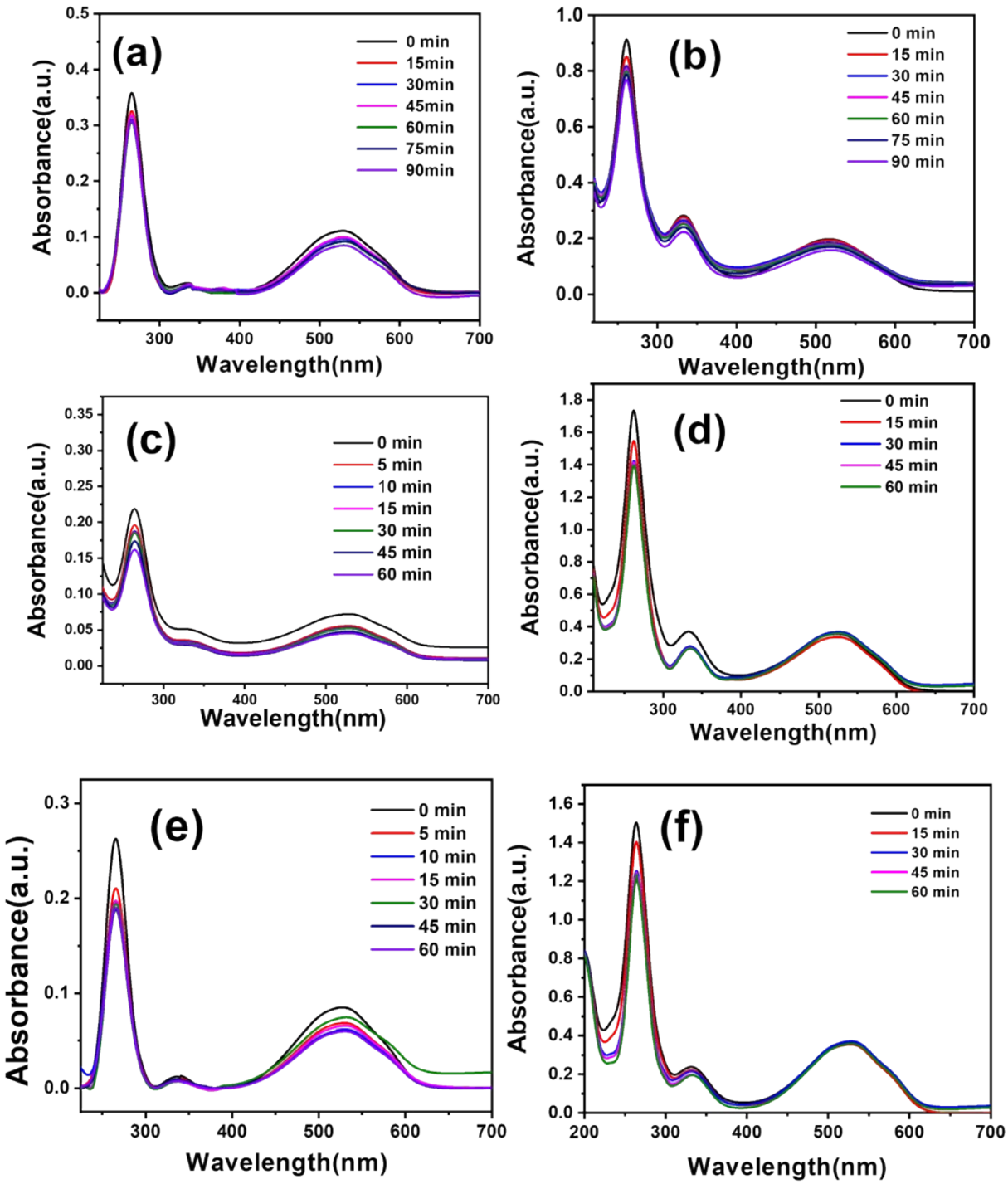

Fig. S6 UV visible spectrum of (a) ZnO (b) TiO_2 (C) ZnO-TiO_2 (d) 3%Co/ZnO-TiO_2 (e) 5%Co/ZnO-TiO_2 and (f) 7%Co/ZnO-TiO_2 after alizarin S adsorption in dark condition

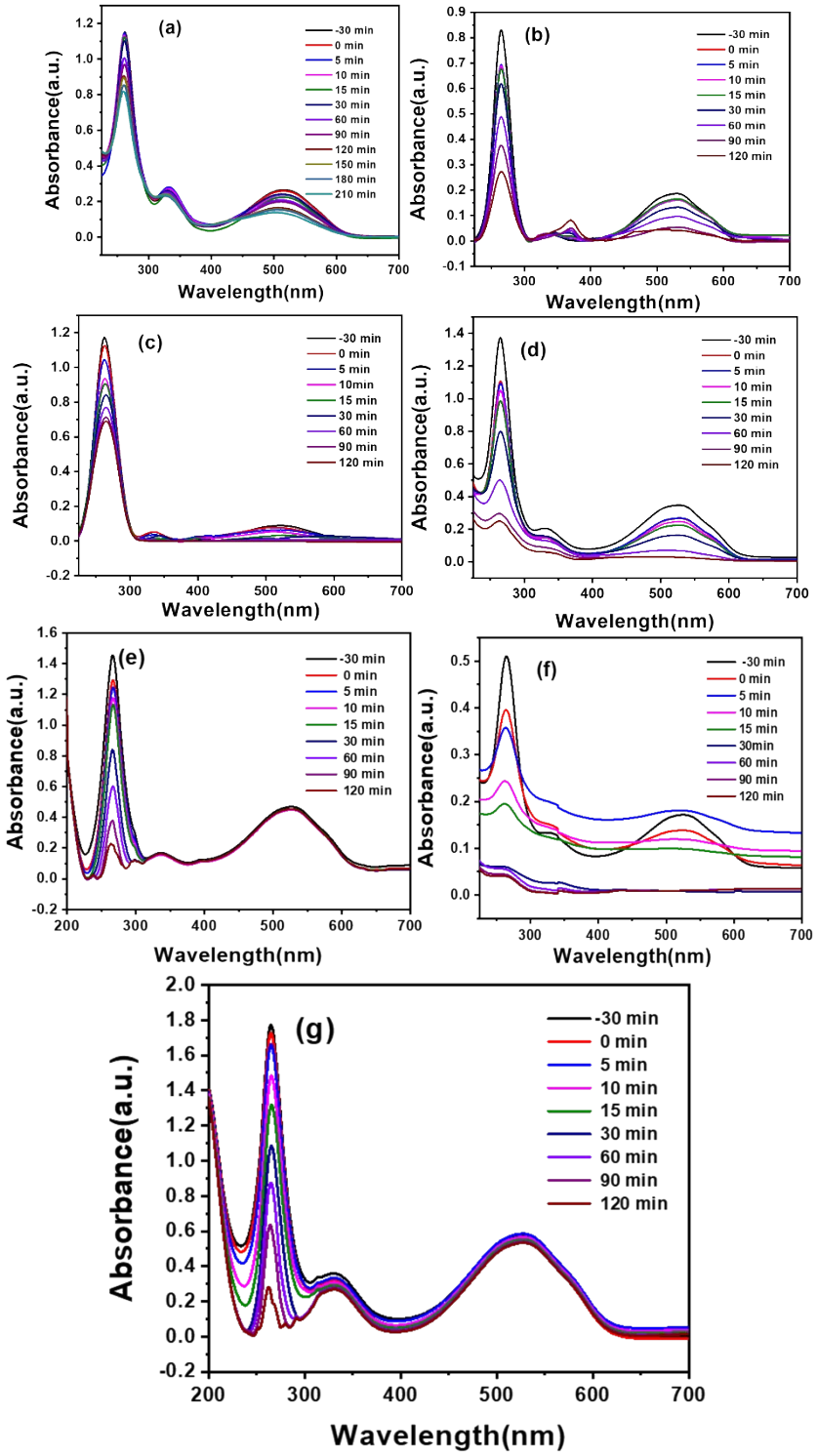

Fig. S7 UV visible spectrum of alizarin S degradation (a) without catalyst (b) ZnO (c) TiO_2 (d) ZnO-TiO_2 (e) 3%Co/ZnO-TiO_2 (f) 5%Co/ZnO-TiO_2 and (g) 7%Co/ZnO-TiO_2

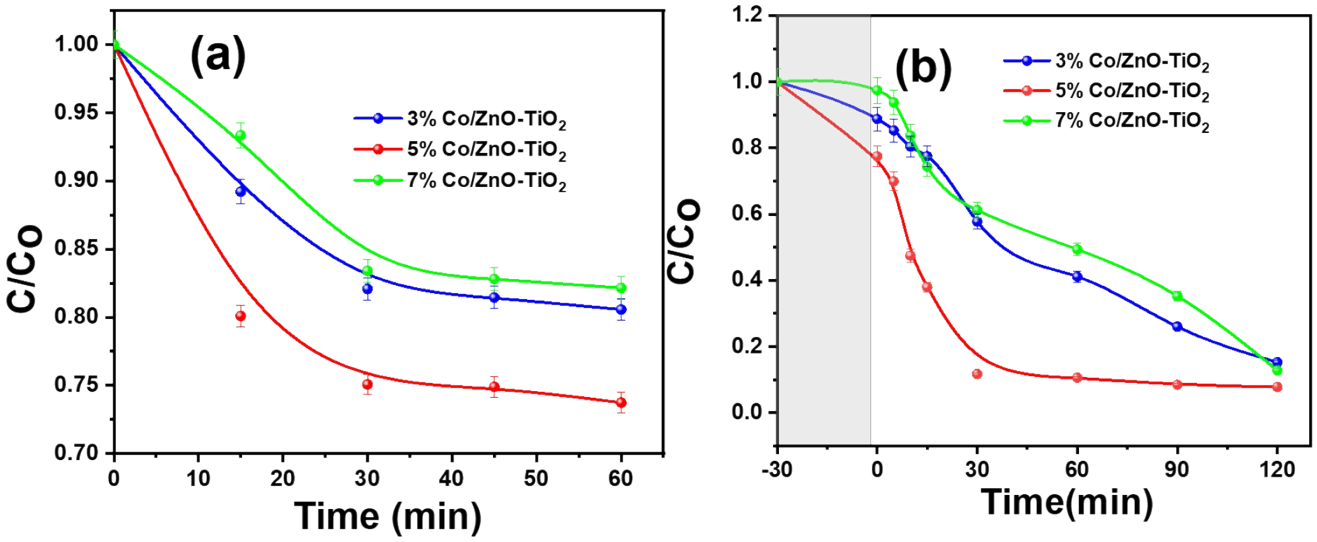

Fig. S8 (a) Adsorption of Alizarin S in dark, and (b) Alizarin S photodegradation over 3%Co/ZnO-TiO_2, 5%Co/ZnO-TiO_2, and 7%Co/ZnO-TiO_2

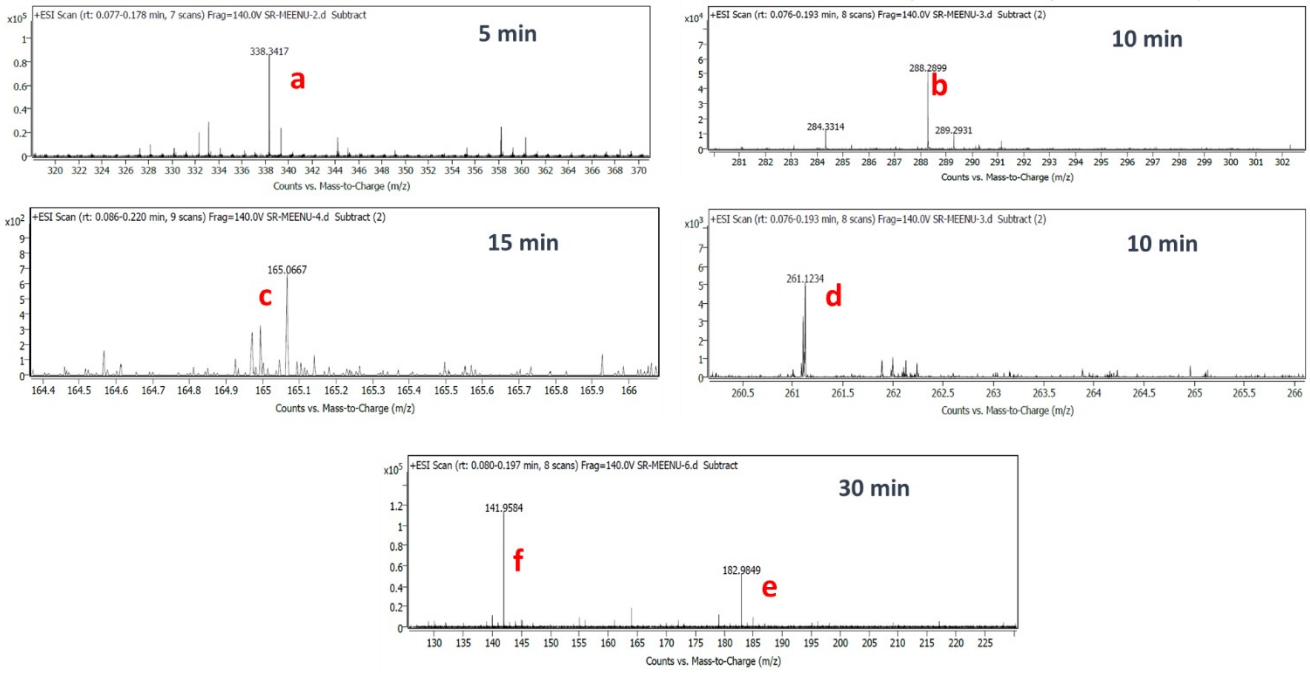

Fig. S9 HR-MS of Alizarin S degradation using 5%Co/ZnO-TiO_2 catalyst production by at various time interval

Table S2: A comparative data on the QY from similar catalysts.

Dye	Catalysts	Light source	Time for degradation (min)	Wavelength of incident light (nm)	Quantum yield (%)	References
Acid Red 37	0.5($ZnO:TiO_2$)/0.18 AgNP	13.4 W	50	254	20.2	[1]
Methylene Blue	Au on ZnO	1000 $W.m^{-2}$	60	664	35	[2]
Acid Red 37	$TiO_2/ZnO/IO_4^-$	13.4	350	254	16.6	[3]
Alizarin S	5%Co/$ZnO-TiO_2$	125 W	120	313	24.1	Our work

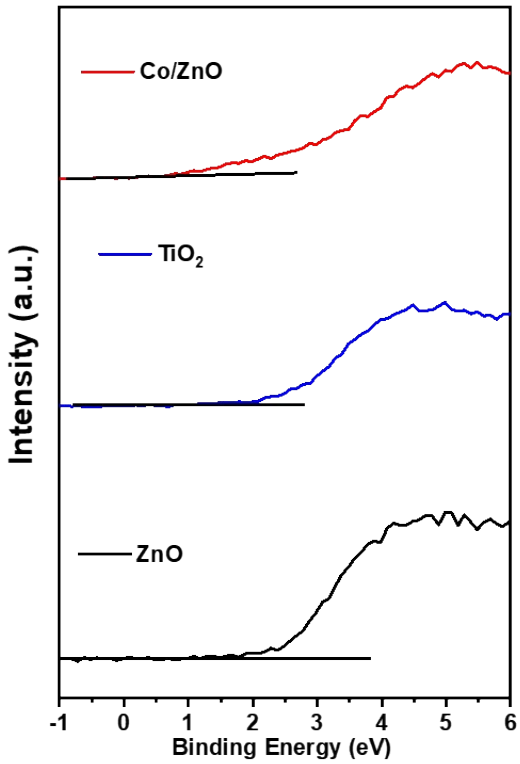

Fig. S10 VB spectra of ZnO, TiO_2 and 5% Co/ZnO.