Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Growth of $LaCO_3OH$ nanowires on Ag_3PO_4 dodecahedron and their efficient photocatalytic activity for RhB degradation under visible light.

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Supporting Information

S1-S3: EDAX profile and HRTEM analysis of samples

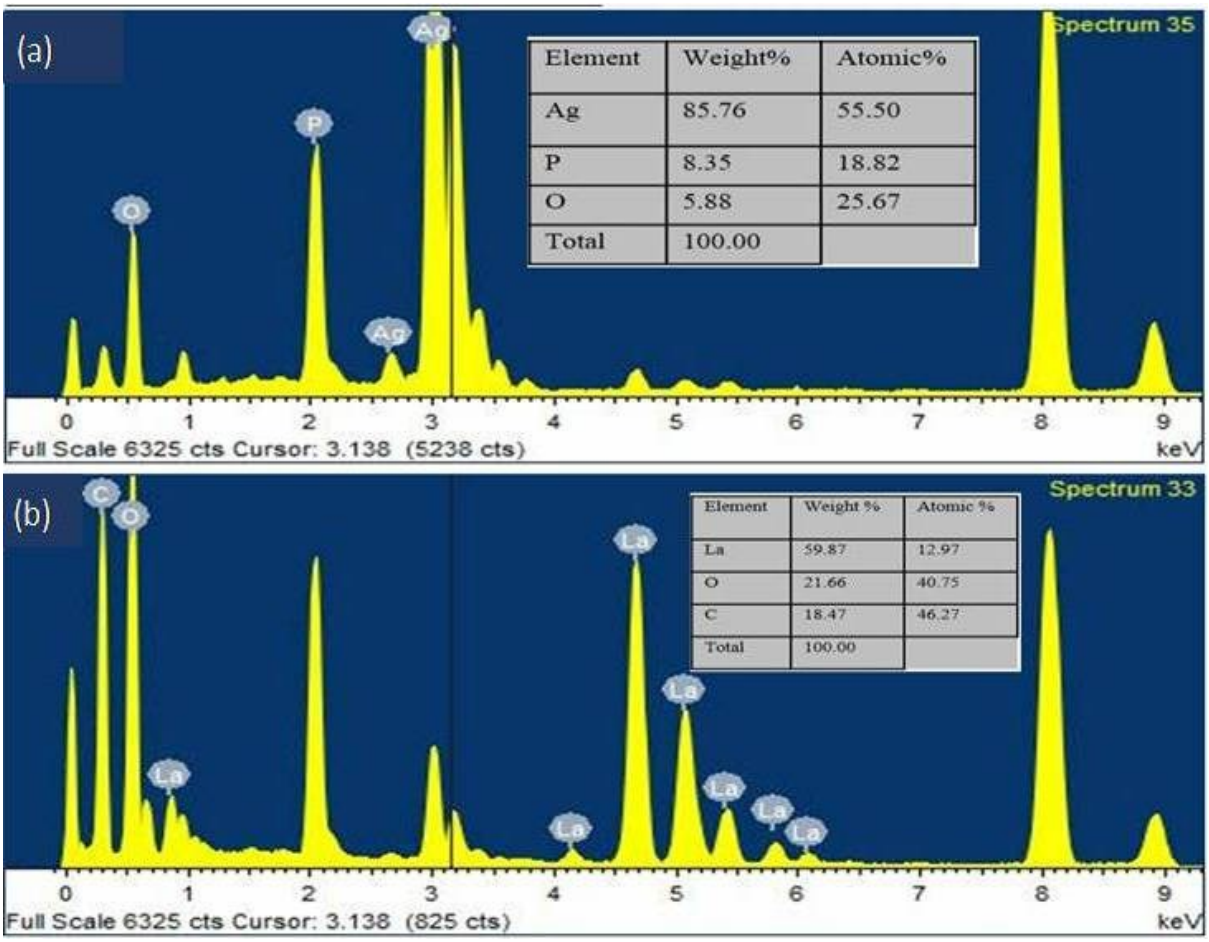


Fig. S1 (a), (b)EDAX profile of APO/LCO-2 sample.

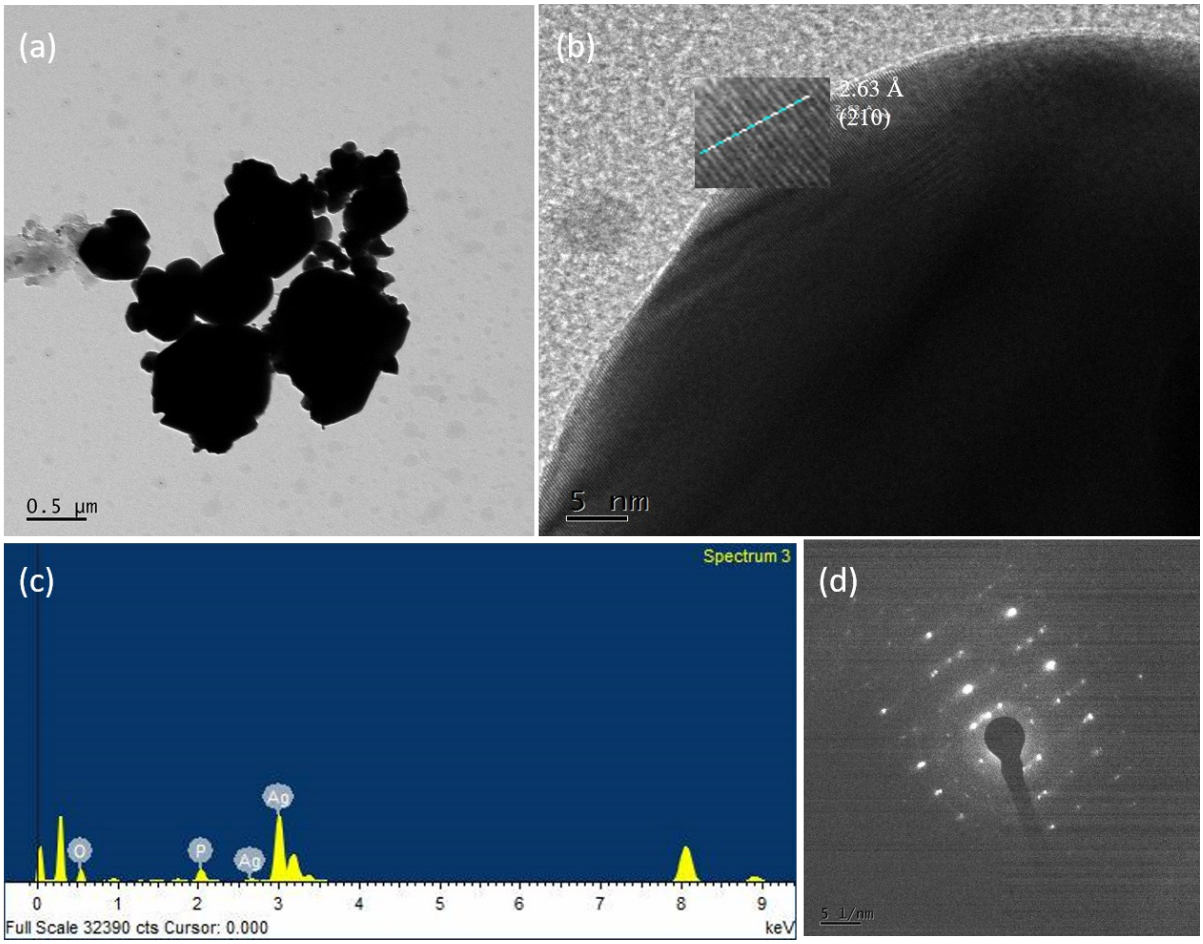


Fig.S2 (a) TEM image of APO with THF as a solvent, (b) HRTEM, (c) EDAX profile of APO with THF sample and (d) the corresponding fast Fourier Transform patterns of Ag_3PO_4.

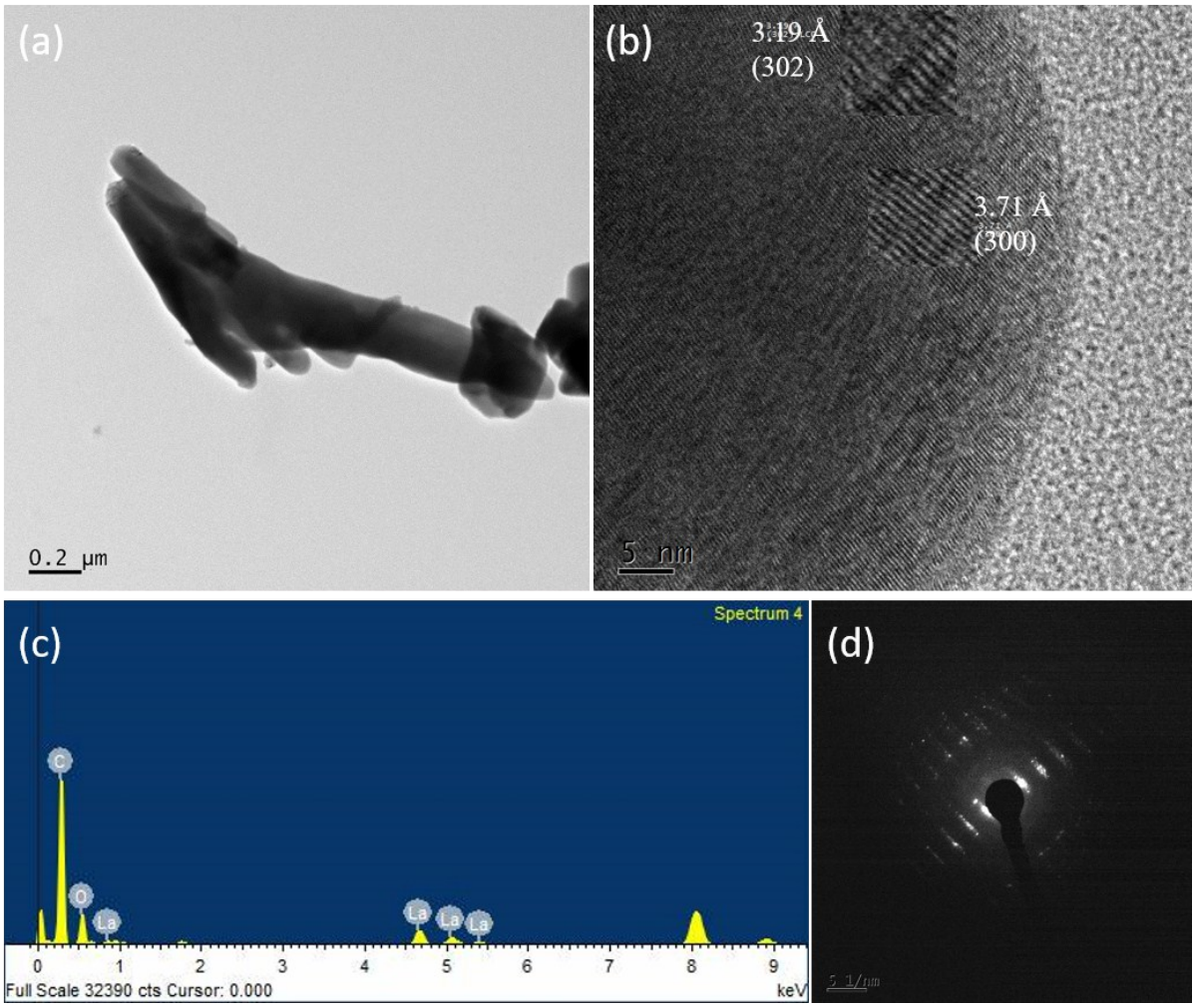


Fig.S3 (a) TEM image of LCO with THF as a solvent, (b) HRTEM, (c) EDAX profile of LCO with THF sample and (d) the corresponding fast Fourier Transform patterns of $LaCO_3OH$.

S4: Photocatalytic recyclability study of the as prepared photocatalyst sample

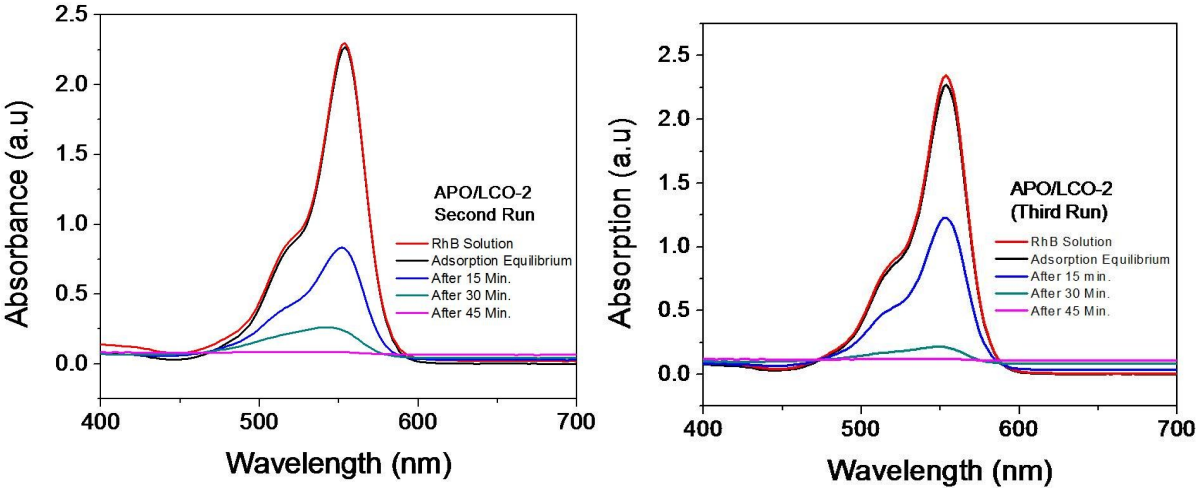
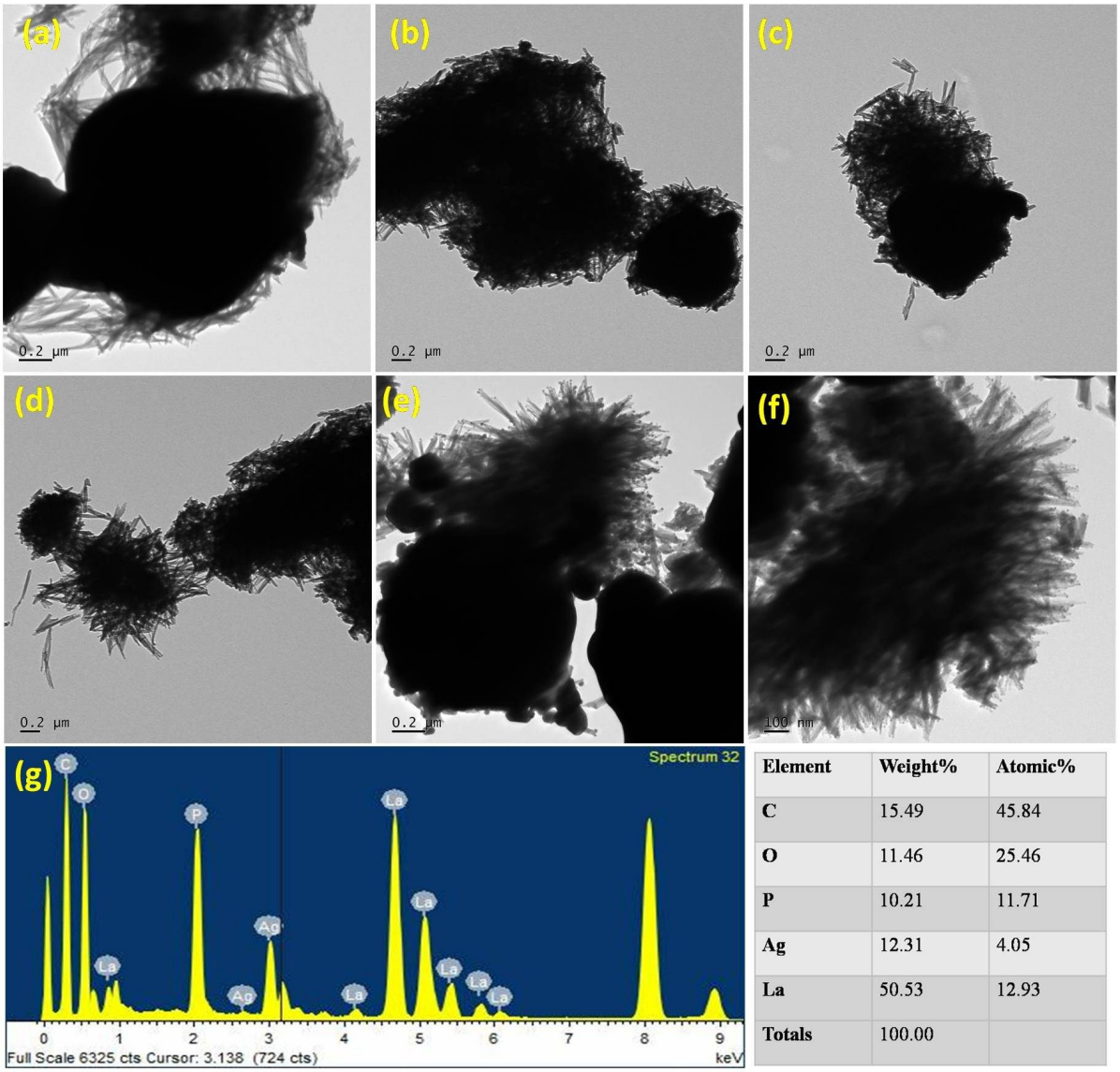


Fig. S4. UV-Visible spectra of RhB degradation using APO/LCO-2 recyclable catalyst

Table S1: Recyclability photocatalytic activity study of APO/LCO-2 catalyst.

Catalyst	Experiment	RhB degraded (%)
APO/LCO-2	First run	98.72
	Second run	96.96
	Third run	94.59

S5: TEM images of APO/LCO-2 sample



Element	Weight%	Atomic%
C	15.49	45.84
O	11.46	25.46
P	10.21	11.71
Ag	12.31	4.05
La	50.53	12.93
Totals	100.00	

Fig. S5 (a)- (f) TEM images of APO/LCO-2 shows growth mechanism of LCO rods on APO, (g) EDAX profile of APO/LCO-2 sample.

Table S2. Comparative study of APO/LCO photocatalyst samples with the literature of Ag_3PO_4 heterostructures

Sr. No.	Material/Composite	Composition	Percentages of RhB degradation	RhB degradation time	References
1.	Ag_3PO_4		100%	75 min.	1
2.	$Ag3PO_4/BiVO_4$ nanocomposite	(molar ratio = 0.8:1.0)	100%	120 min.	1.
3.	Ag_3PO_4	Used $NH_3.H_2O$ (to maintain pH=7)	63%	140 min.	2.
4.	Ag_3PO_4	Used H_3PO_4 (to maintain pH=7)	24%	140 min.	2.
5.	Ag_3PO_4		64%	180 min.	3.
6.	RGO-Ag_3PO_4	2% RGO- Ag_3PO_4	98%	180 min.	3.
7.	Ag_3PO_4		60%	100 min.	4.
8.	Ag_3PO_4/Bi_2MoO_6	10.0 wt% Ag_3PO_4/ Bi_2MoO_6	98%	100 min.	4.
9.	Ag_3PO_4		75.4%	40 min.	5.
10.	Ag_3PO_4/C_3N_4 composite	92% Ag_3PO_4- C_3N_4	95.7%	40 min.	5.
11.	Ag/Ag_3PO_4	composite	100%	120 min.	6.
12.	AgI/Ag_3PO_4	composite	100%	60 min.	6.

S6:Current –Voltage characteristic

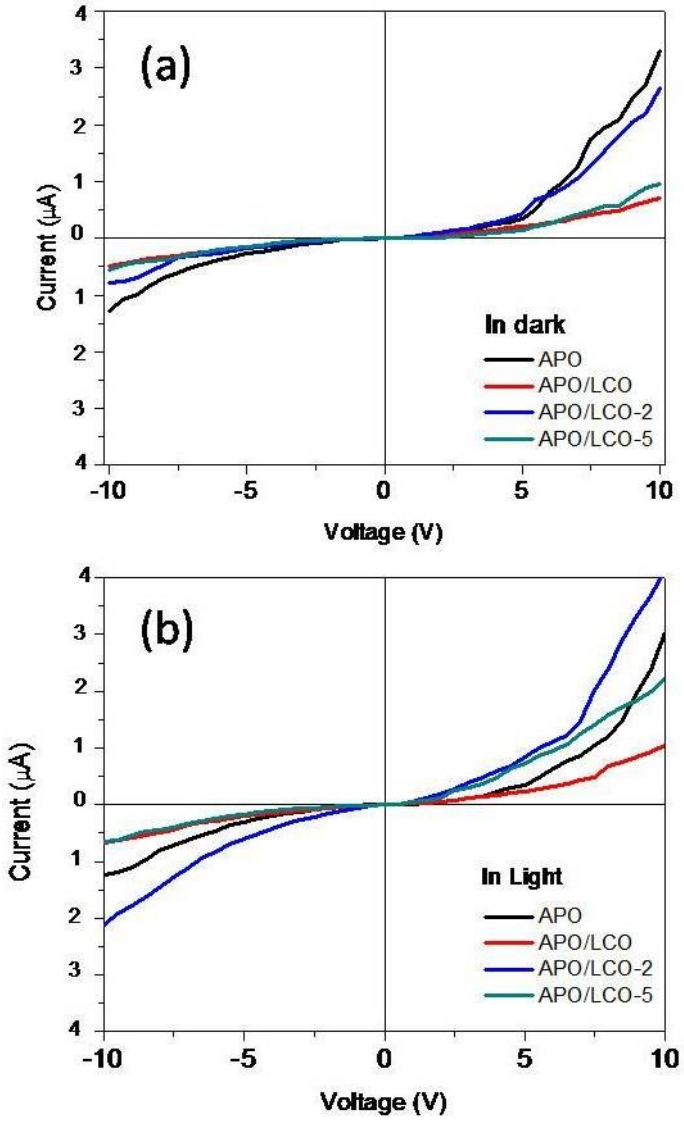


Fig. S6. I-V curve of (a)APO, APO/LCO, APO/LCO-2, APO/LCO-5 samples in dark (b) I-V curve of APO, APO/LCO, APO/LCO-2, APO/LCO-5 samples in light.

S7:Electrochemical Impedance Spectroscopy (EIS)

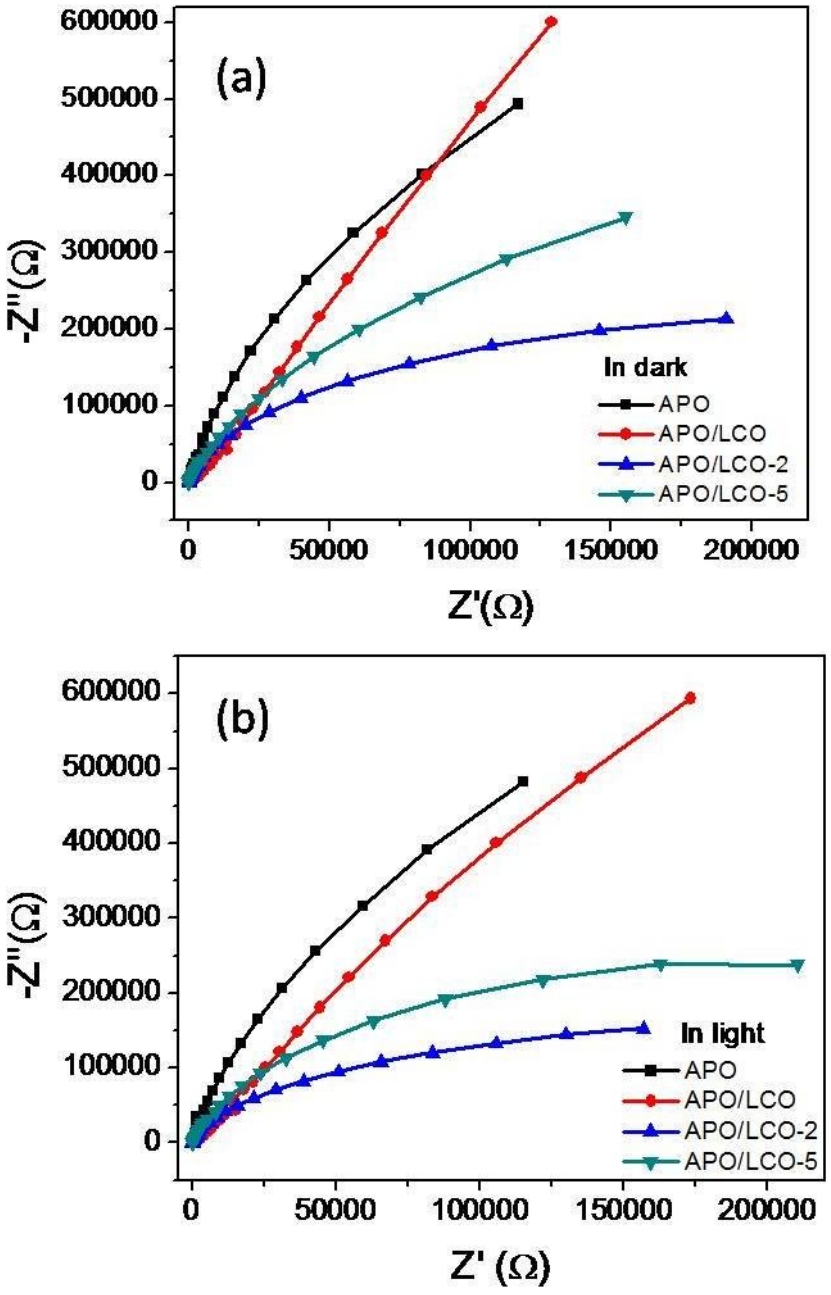


Fig. S7. (a) EIS performance of APO, APO/LCO, APO/LCO-2 and APO/LCO-5 composites in dark (b) EIS performance of APO, APO/LCO, APO/LCO-2 and APO/LCO-5 composites inpresence of light .

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