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Article

Co_3O_4 nanopetals on Si as photoanodes for the oxidation of organics

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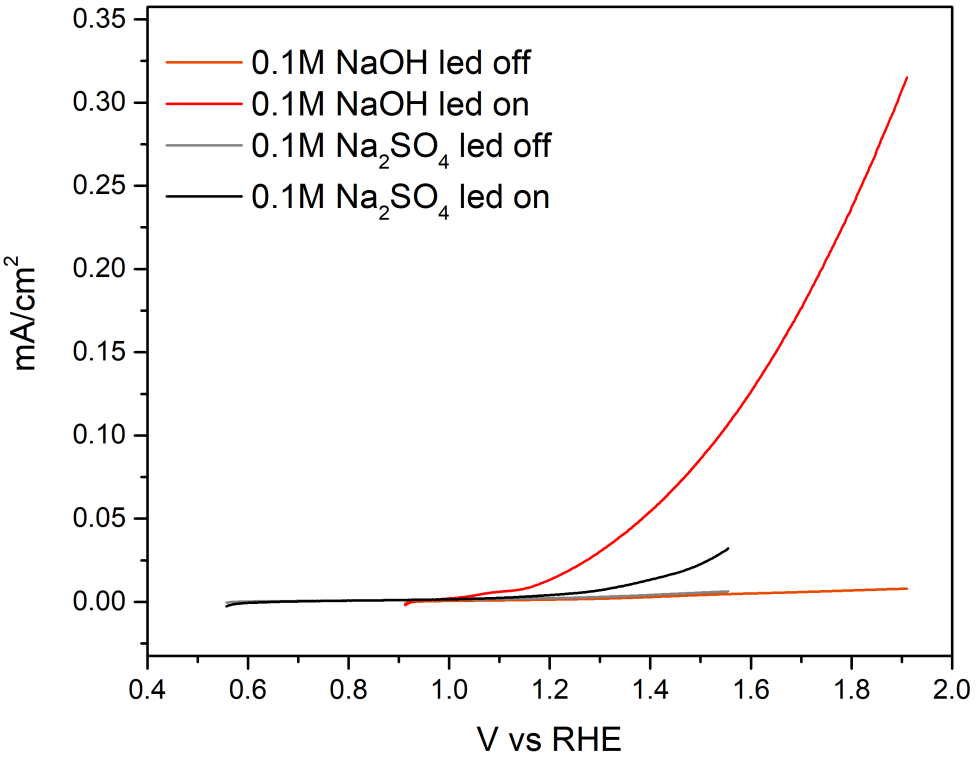

Figure S1. Linear sweep voltammetry (5mV/s) under illumination of the PETAL sample in different electrolyte solutions.

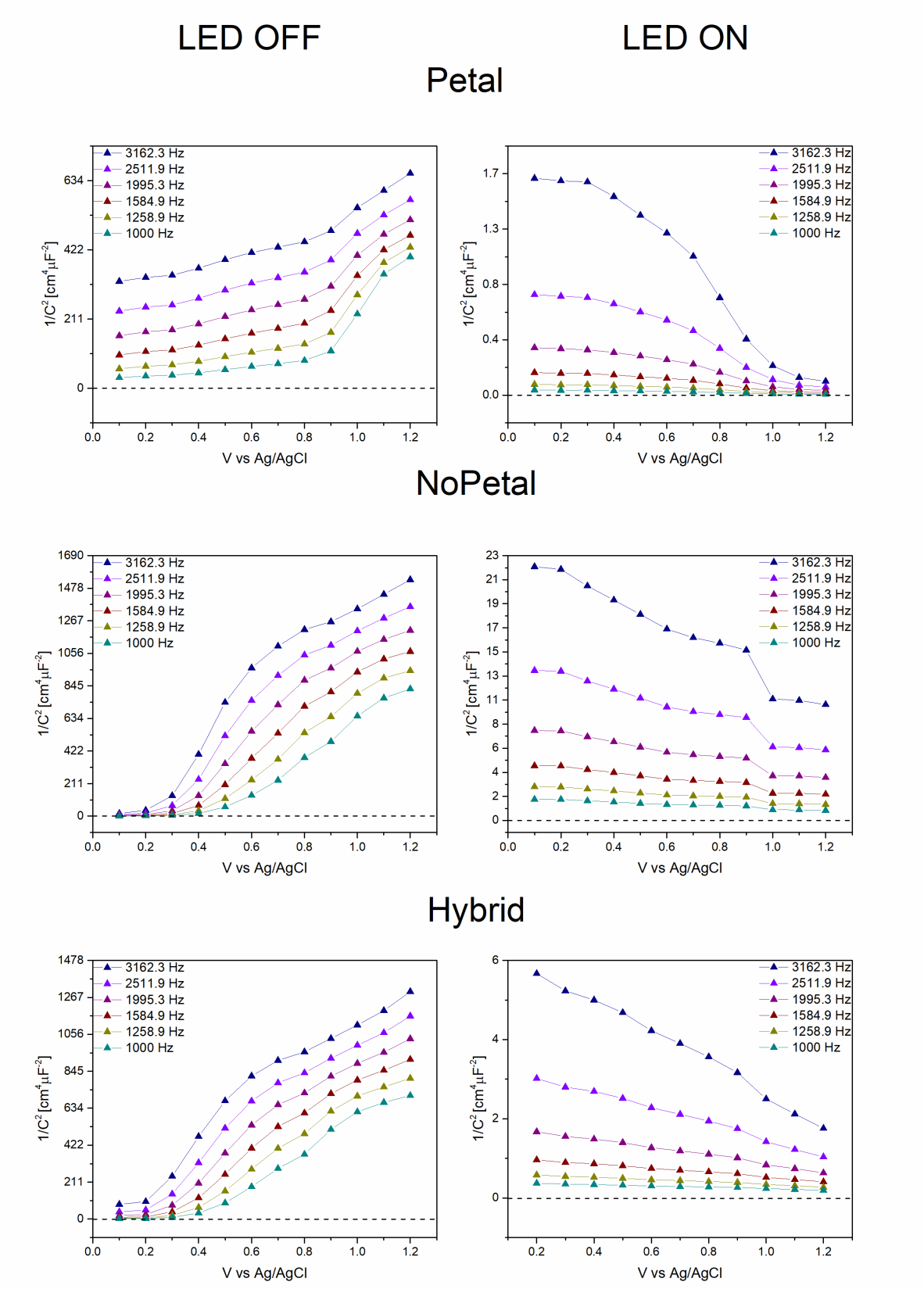

Figure S2. Mott-Schottky plots of the prepared samples in the dark and under illumination in Na_2SO_4.

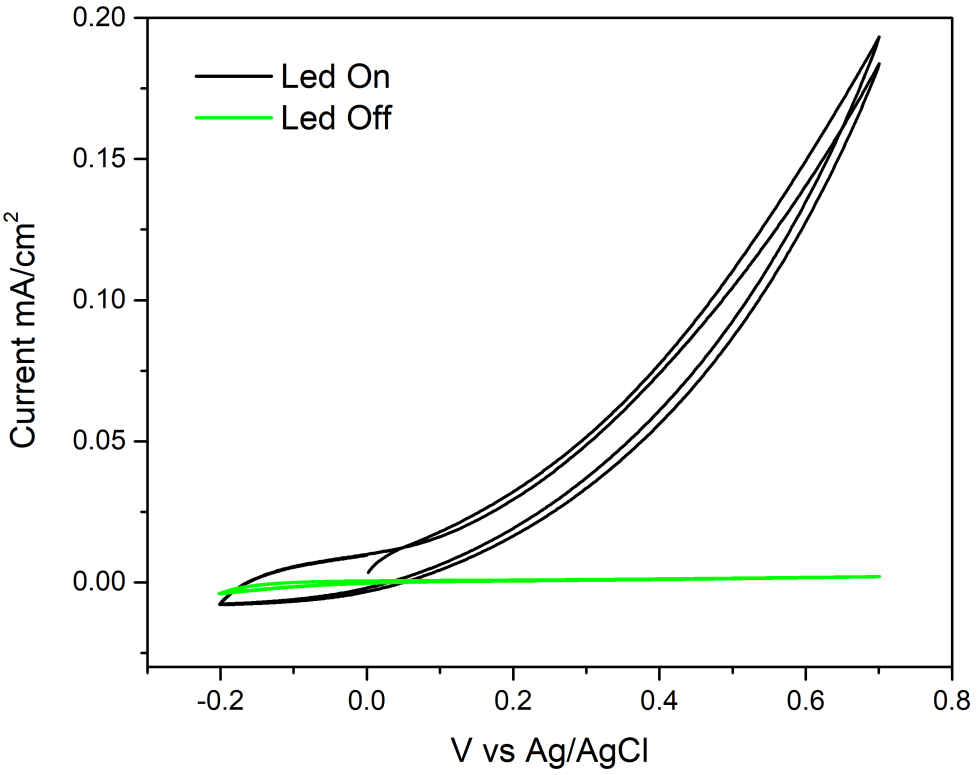

Figure S3. Cyclic voltammetry performed on sample PETALS, in 0.1 M NaOH and 5 mM glucose with scan rate of 40 mV/s in the dark and with illumination.

Table S1. Sensing in Sodium Sulphate 0.1 M at 1 V vs Ag/AgCl.

	Petal	**NoPetal**	**Hybrid**
Sensibility $mA/cm^2 \times M^{-1}$	7.5 ± 0.1	2.4 ± 0.1	2.4 ± 0.2
Dev.Standard (μA/ cm^2)	0.006	0.002	0.003
LOD (μM)	2.3 ± 1.7	2.5 ± 0.1	3.9 ± 0.3
LOQ (μM)	7.7 ± 0.6	8.4 ± 0.4	12.9 ± 1.0
Linear Range (μM)	$0 \div 4$	$0 \div 2$	$0 \div 2$

Table S2. Equivalent Circuit parameters.

	Double Layer			$Co_3O_4/SiO_x/Si$			Co_3O_4 surface states		
PETALS	R1 (Ω)	CPE-T1 (F)	CPE-α1	R2 (Ω)	CPE-T2 (F)	CPE-α2	R3 (Ω)	CPE-T3 (F)	CPE-α3
led off 0.1 V	6.7E+04	1.7E-04	0.68	3.5E+03	6.2E-08	0.90	1.9E+03	1.0E-09	0.97
led on 0.1V	4.3E+04	1.5E-04	0.85	1.6E+03	5.1E-10	1.00	5.8E+02	4.8E-07	0.64
led off 1V	3.7E+03	9.7E-05	0.87	9.2E+03	5.4E-08	0.93	2.2E+03	2.1E-09	0.92
led on 1V	4.0E+02	2.7E-03	0.63	5.8E+01	2.1E-05	0.71	1.2E+03	8.9E-10	0.99

NO PETALS	R1 (Ω)	CPE-T1 (F)	CPE-α1	R2 (Ω)	CPE-T2 (F)	CPE-α2
led off 0.1 V	9.9E+04	5.4E-06	0.82	1.3E+03	7.0E-08	0.81
led on 0.1V	3.7E+04	6.3E-06	0.84	1.4E+03	1.9E-07	0.74
led off 1V	6.8E+04	4.7E-06	0.73	1.5E+04	3.3E-08	0.94
led on 1V	3.6E+03	7.1E-06	0.82	1.1E+03	4.5E-07	0.65

HYBRID	R1 (Ω)	CPE-T1 (F)	CPE-α1	R2 (Ω)	CPE-T2 (F)	CPE-α2
led off 0.1 V	1.4E+04	3.6E-06	0.89	4.5E+04	1.2E-07	0.80
led on 0.1V	5.4E+03	5.2E-06	0.88	2.1E+03	1.3E-08	0.80
led off 1V	9.3E+03	4.0E-06	0.90	3.0E+03	5.9E-08	0.85
led on 1V	1.2E+03	5.3E-06	0.86	1.6E+03	9.9E-09	0.81

The columns are ordered according to increasing frequency values; lower frequencies correspond to the Helmholtz layer interface, the highest frequencies correspond to the Co_3O_4 space charge layer with surface states and the intermediate frequencies are assigned to the Co_3O_4 SiO_x interface. α is the frequency dispersion coefficient.