Electronic Supplementary Material (ESI) for Nanoscale Advances.

Bandgap engineering via Boron and Sulphur doped carbon modified Anatase TiO_2: A Visible light stimulated Photocatalyst for Photo-Fixation of N_2 and TCH Degradation

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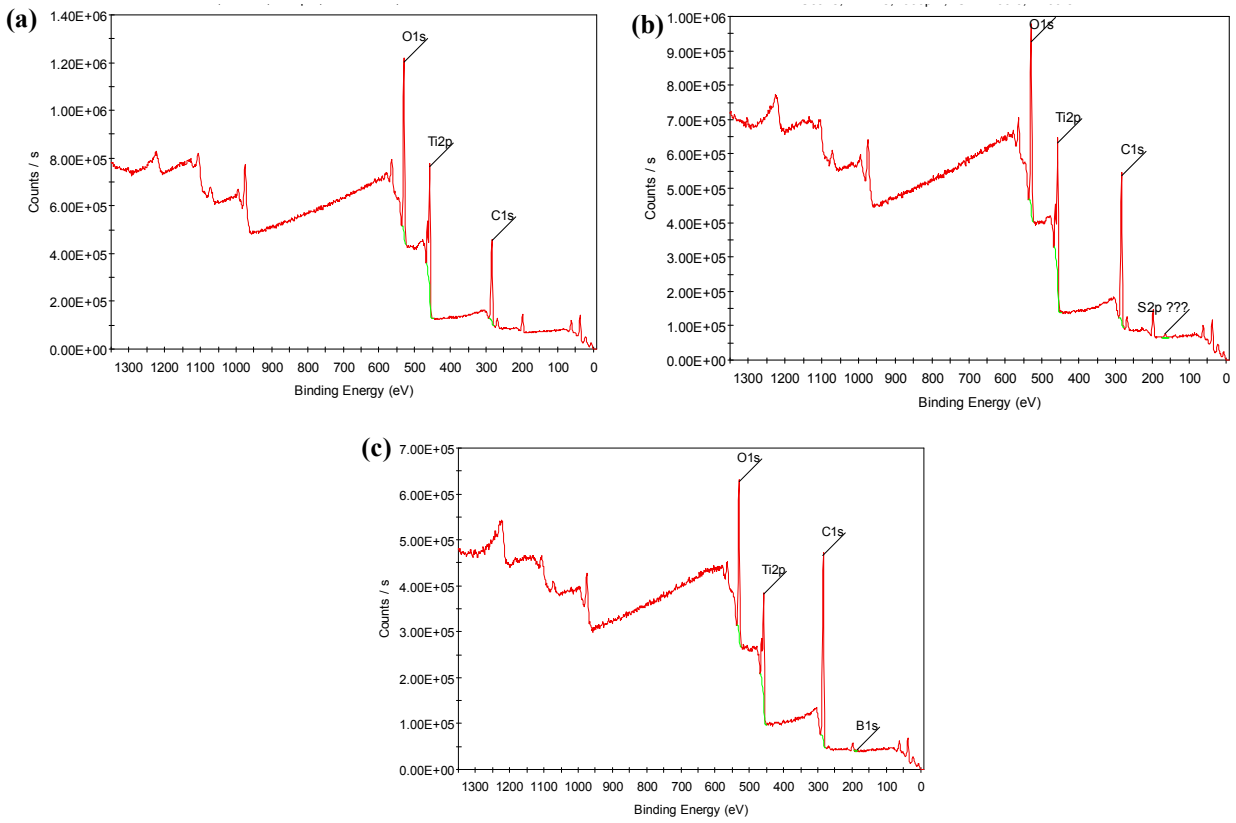

Figure. S1 XPS survey spectrum of (a) CT, (b) S-CT and (c) B-CT.

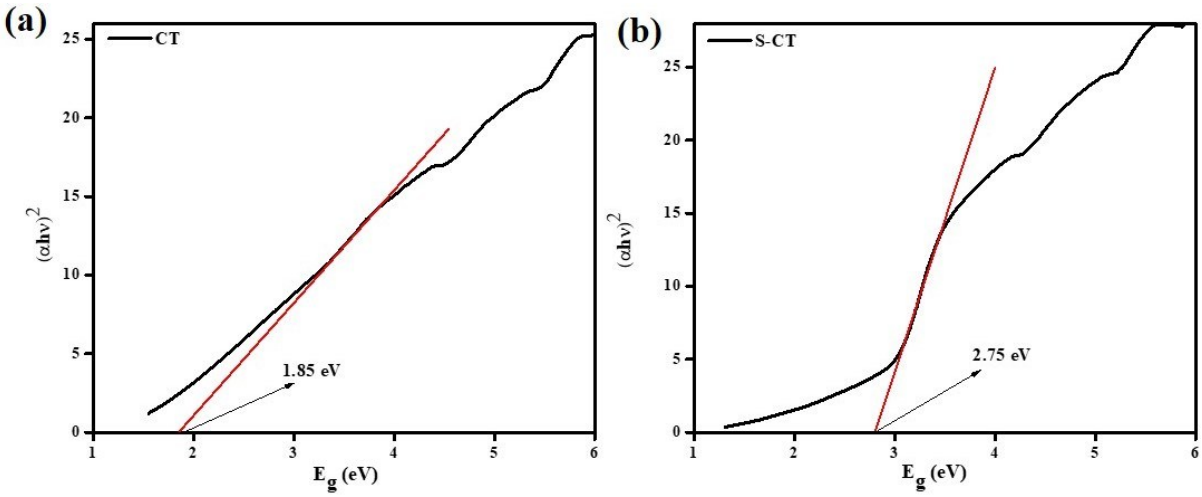

Figure. S2 Bandgap energy of (a) CT and (b) S-CT

Urbach energy calculation

Following the mathematics $\alpha = \alpha_0 \exp[E/E_u]$, where α stands for absorption coefficient, E as the energy of photon and E_u represents Urbach energy respectively. [1,2] As the absorption coefficient is equal to absorbance (A or F(R)) for solid samples, so α can be substituted by A. [2] The Urbach energy was calculated by taking the reciprocal of the slope of the graph that is plotted between lnA vs E.

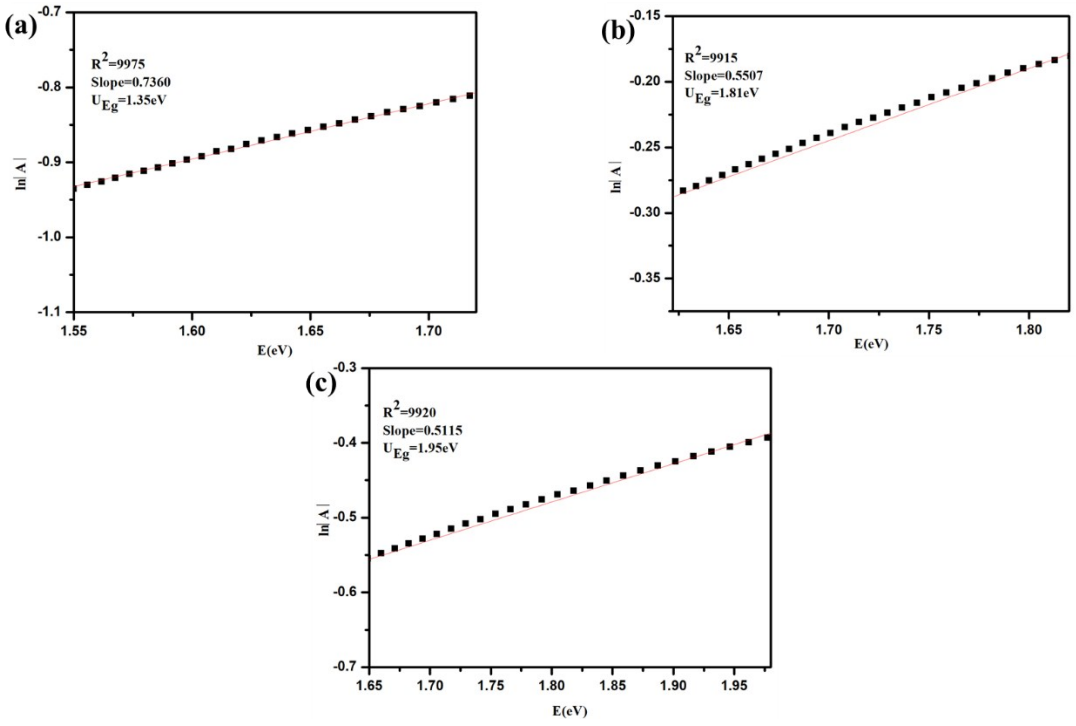

Figure. S3 Urbach energy (a) CT, (b) S-CT and (c) B-CT.

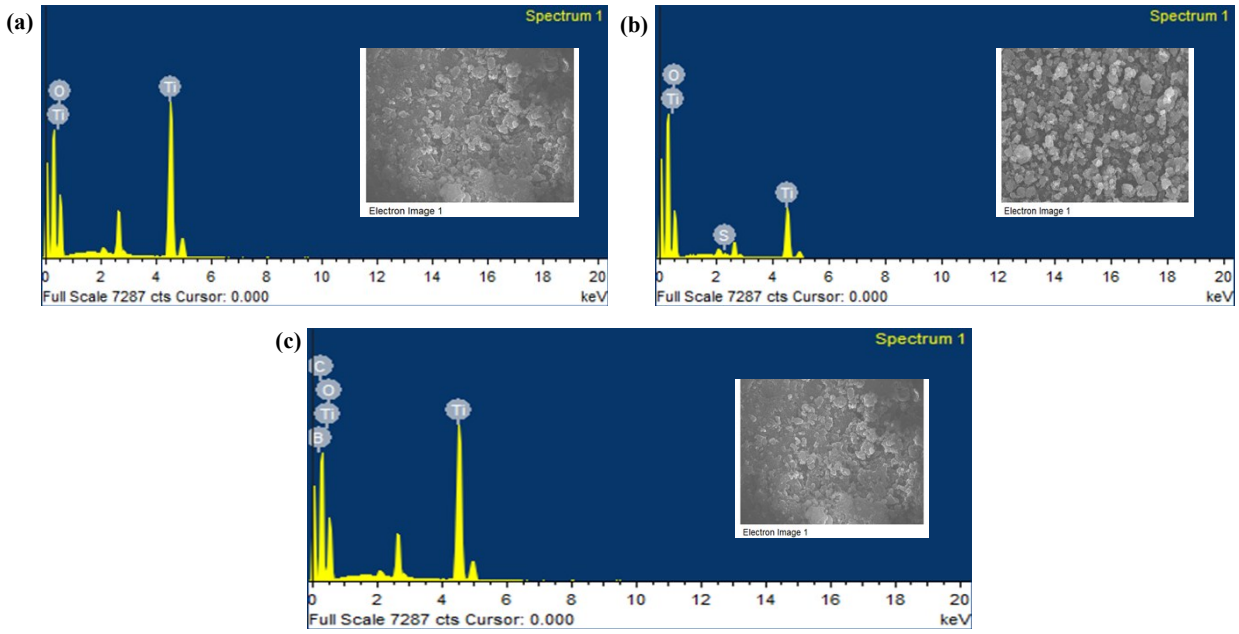

Figure. S4 EDX of (a) CT, (b) S-CT and (c) B-CT.

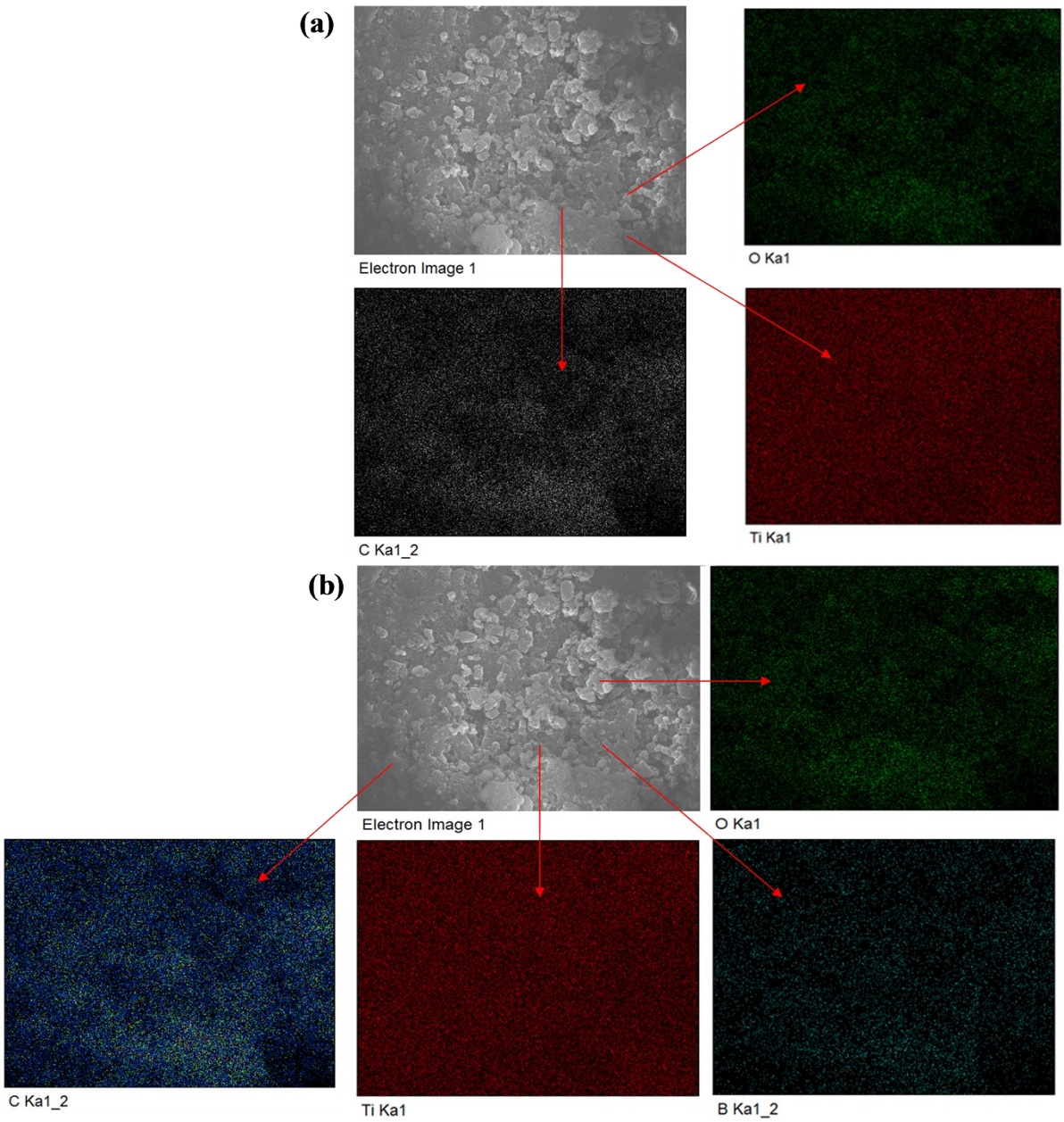

Figure. S5 Elemental colour mapping of (a) CT and (b) B-CT.

Catalytic system	Antibiotic type	Degradation%	Light source	Time period	Reference
Au/B-TiO_2/rGO	15ppm TCH	100	300W Xe lamp	60min	3
Cu-TiO2@functionalized SWCNT	30ppm sulfamethazine	100	Open sunlight	180min	4
Al-doped TiO_2	($2*10^{-4}$M)	93	(103800	120min	5

Nanoflakes	Fluoroquinolone		lux as per HTC LX102A lux meter		
Co-TNs/rGO	30ppm TCH	60	Halogen, ECO OSRAM 500 W lamp	180min	6
N-doped TiO_2	1.0×10^{-2} mol L^{-1} cefazolin	80	5 × 8W blacklight fluorescent lamps	30min	7
Co-doped TiO_2	10ppm	>90	Xe lamp	240 min of irradiation under UV-C and 300 min under visible irradiation	8
Carbon-sensitized and nitrogen-doped TiO_2	5ppm	95	LED flexible strip (SMD 5016 water research 45 (2011) 5015 - 5026 5050, 15W)	5h	9
Nitrogen-doped TiO_2/diatomite	20ppm	91	150W Xe lamp	90min	10
B-CT	10ppm	95	250W Xe-lamp	60min	Present work

Table. T1 comparison table representing different doped TiO_2 towards antibiotic degradation.

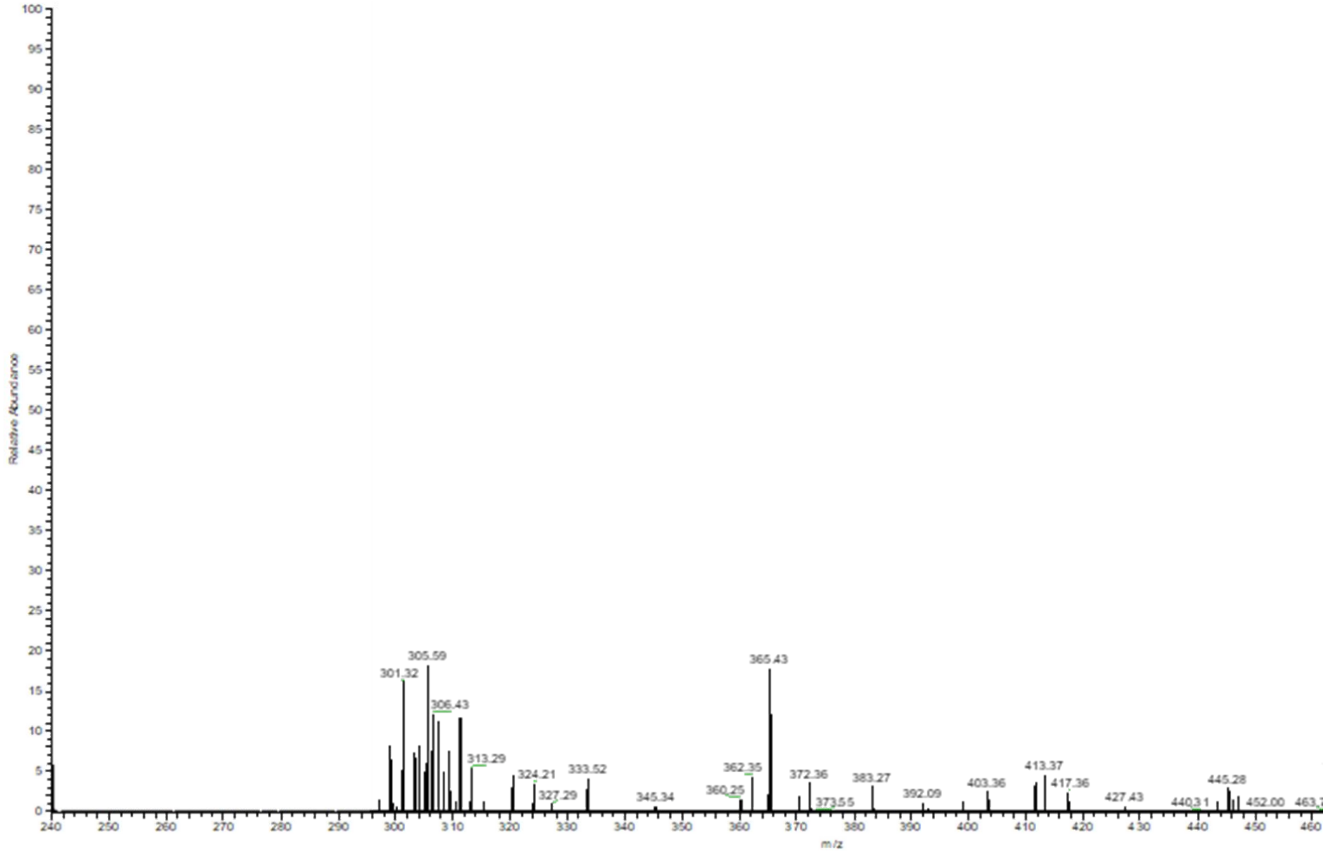

Figure. S6 LC-MS chromatogram of TCH over B-CT.

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