Supplementary Materials

Table S1. Crystal lattice parameter values of GCTO 2, GCTO 5 and GCTO 10

Sample	$a\ (A^0)$	$c\ (A^0)$	c/a	$D\ (nm)$
GCTO 2	3.780	9.470	2.505	11.45
GCTO 5	3.782	9.489	2.508	9.40
GCTO 10	3.784	9.494	2.509	7.09

Table S2. Raman active lines for GO, r-GO and GCTO 5

Sample type	*Position of* $D-Band(cm^{-1})$	*Position of* $G-Band(cm^{-1})$	I_D	I_G	I_D/I_G
$r-GO$	1346.41	1593.93	1400.77	1408.39	0.99
$GCTO\ 5$	1346.56	1589.46	1328.36	1288.96	1.03

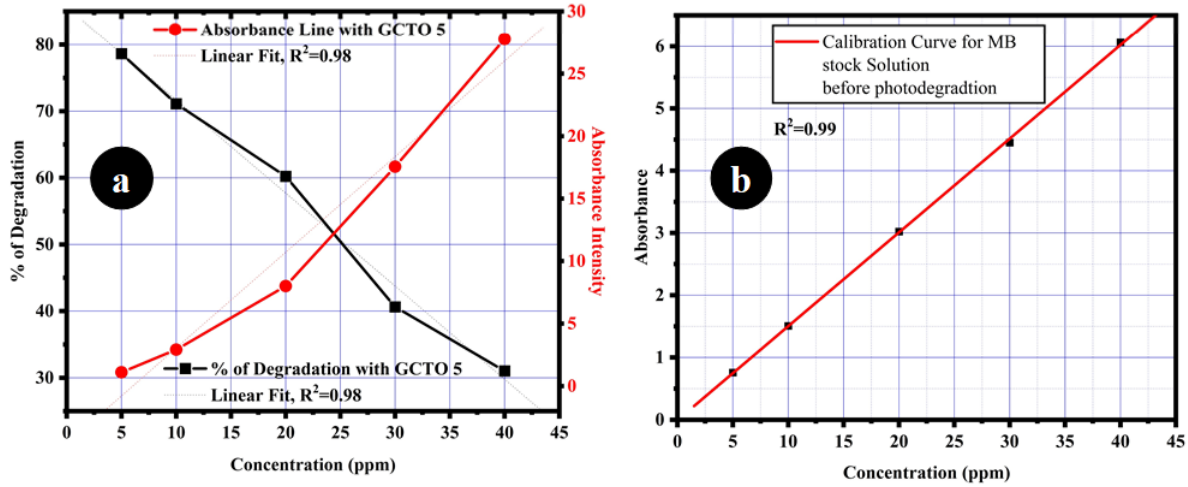

Fig. S1. (a)Absorbance intensity and % of Degradation Vs concentration variation with GCTO 5 maintaining pH 10, time = 75 min. (b)Calibration line of MB with concentration before photodegradation

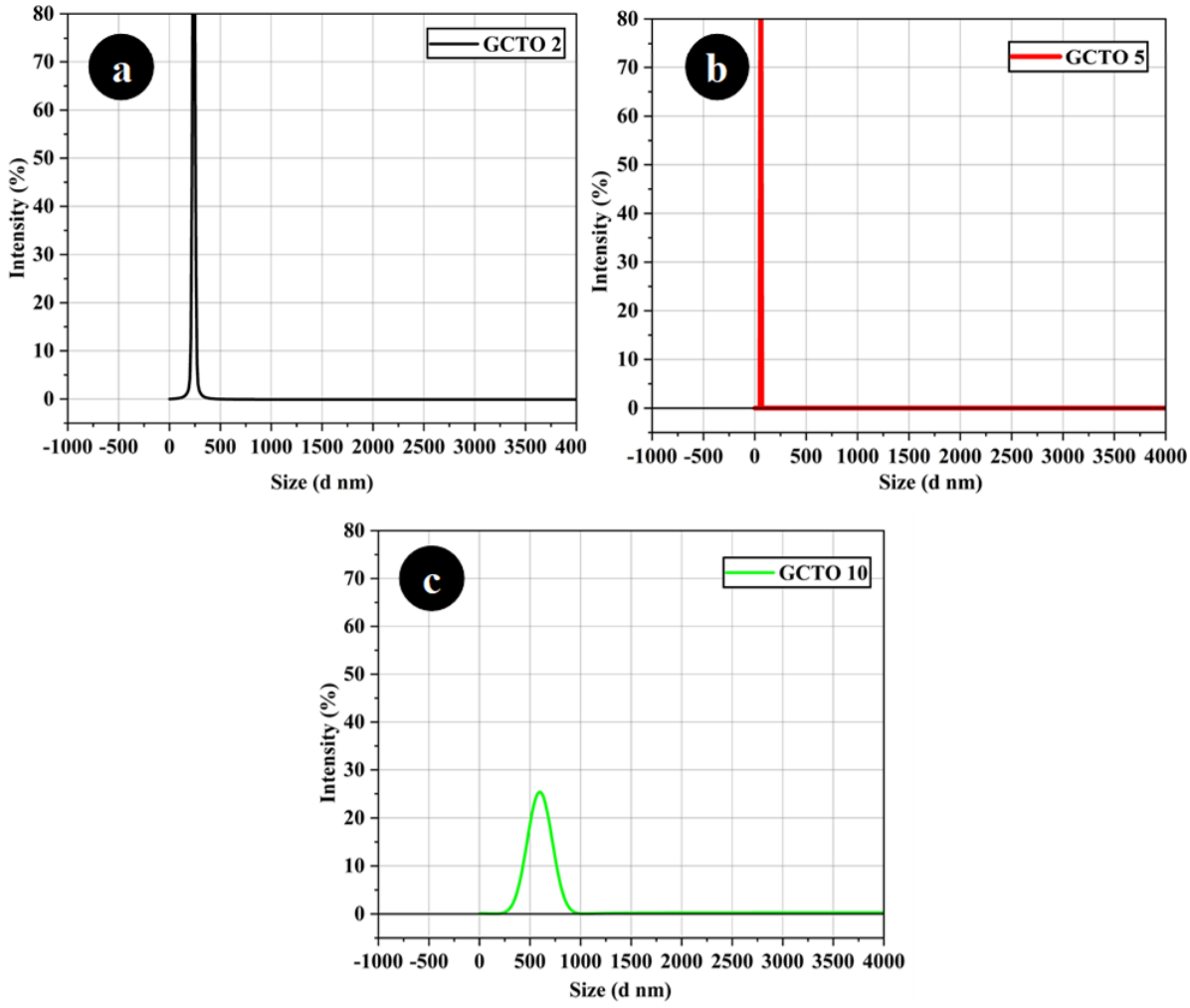

Fig. S2. Hydrodynamic diameter (d_{nm}) for (a) GCTO 2 (b) GOCTO 5 (c) GCTO 10.

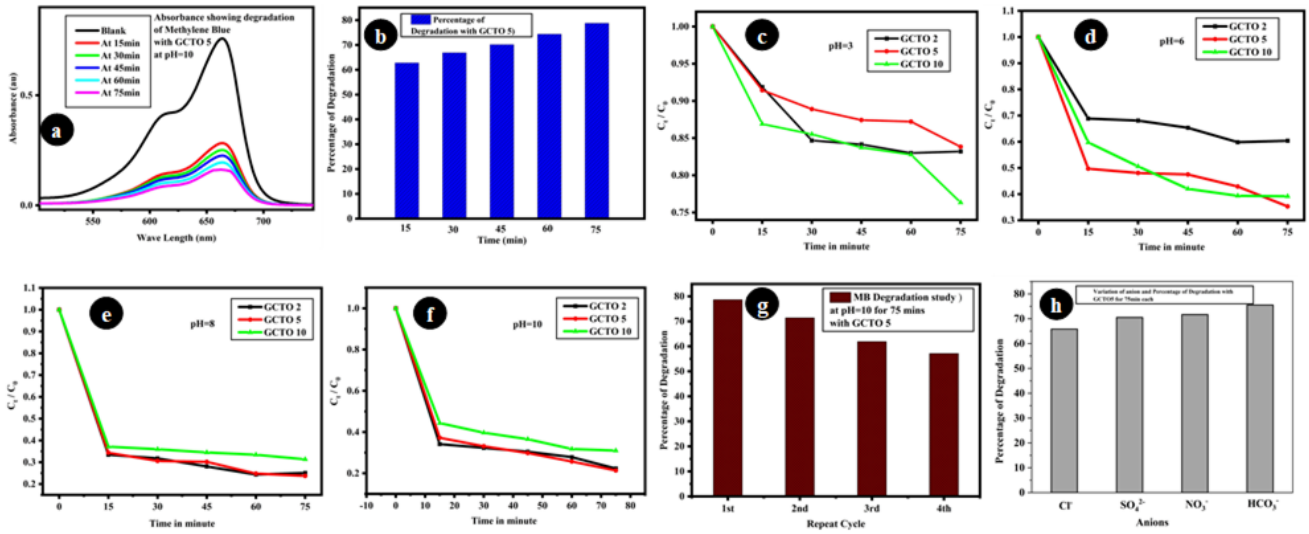

Fig. S3. (c-f) Showing the degradation studies of MB at different pH 3, 6, 8 and 10 (a) Absorbance at different time interval of MB degradation (b) Percentage of degradation at different time interval (g) Catalytic performance and repeat cycle study (h) Degradation of MB with anion variation.

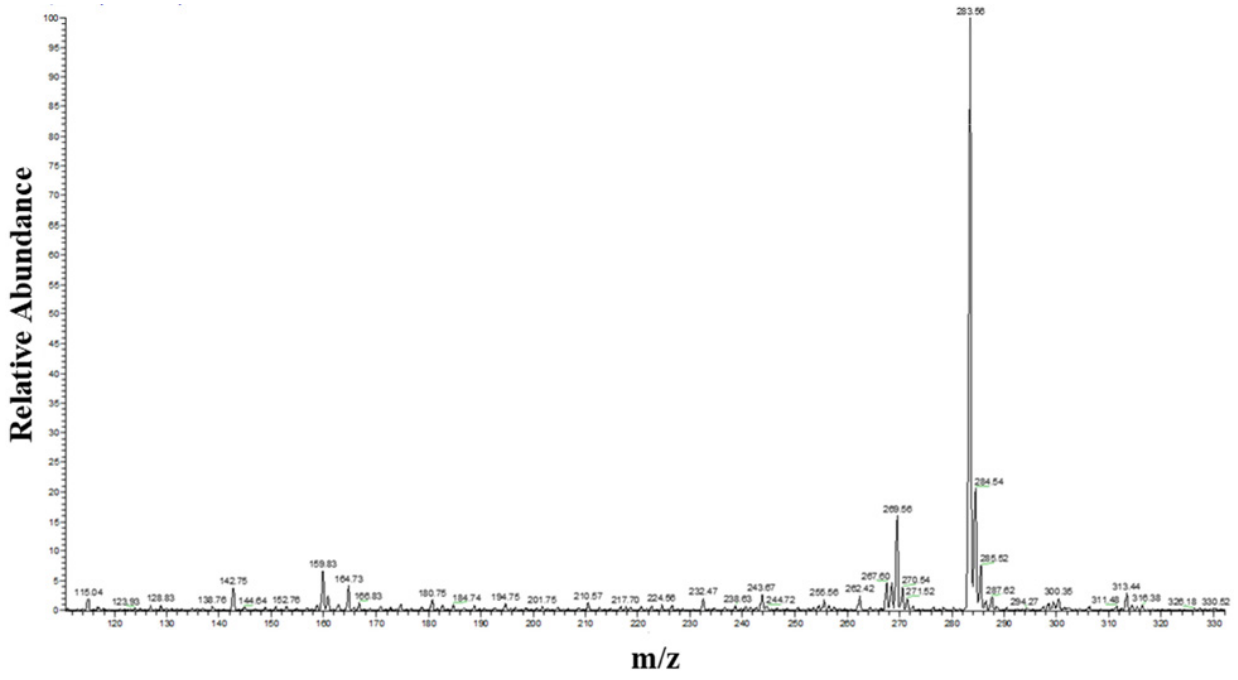

Fig. S4. LC-MS indentification of methylene blue.

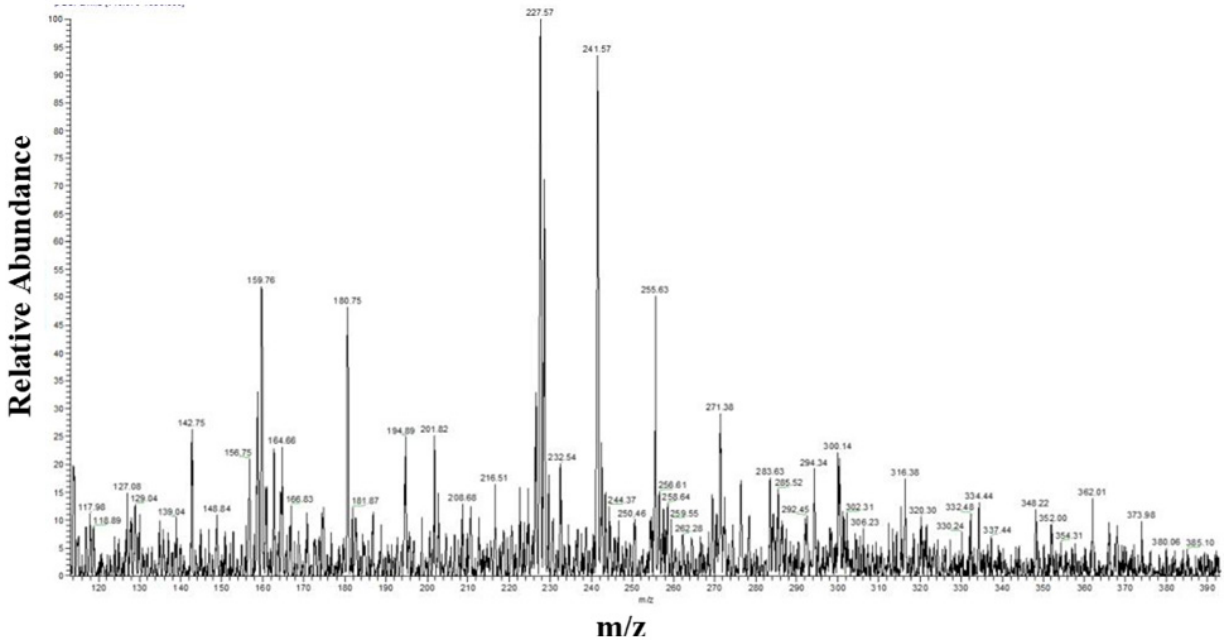

Fig. S5. LC-MS identification of degraded MB intermediates after 75 mins.

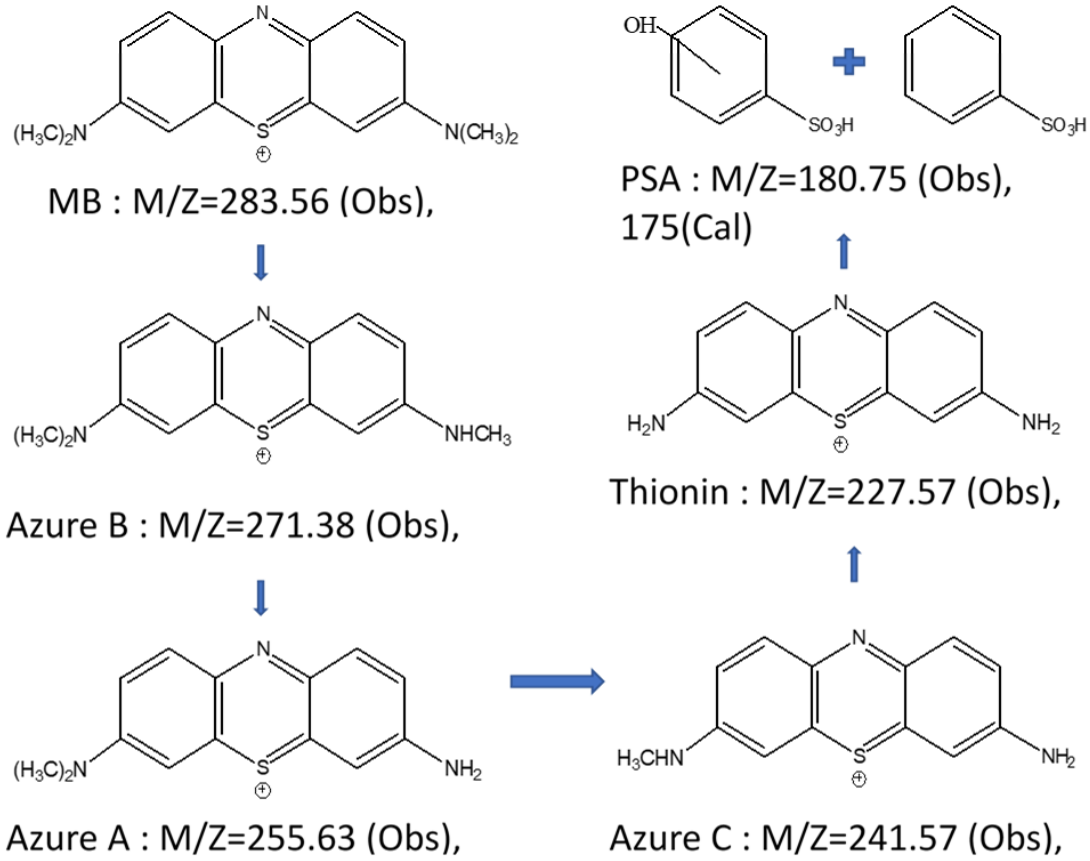

Fig. S6. Proposed mechanistic path for the degradation of MB where Obs = observed value from LCMS data and Cal= calculated value of the compound/intermediate

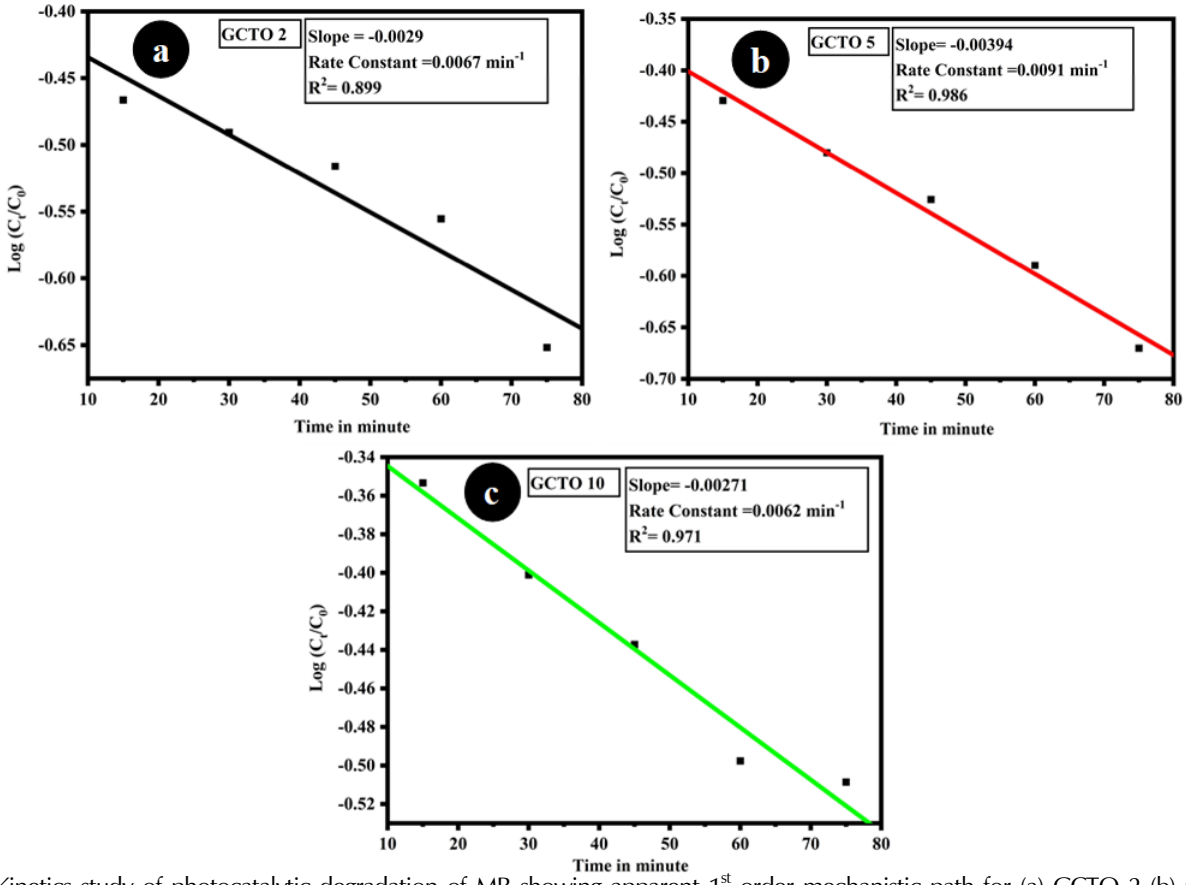

Fig. S7. Kinetics study of photocatalytic degradation of MB showing apparent 1st order mechanistic path for (a) GCTO 2 (b) GCTO 5 (c) GCTO 10

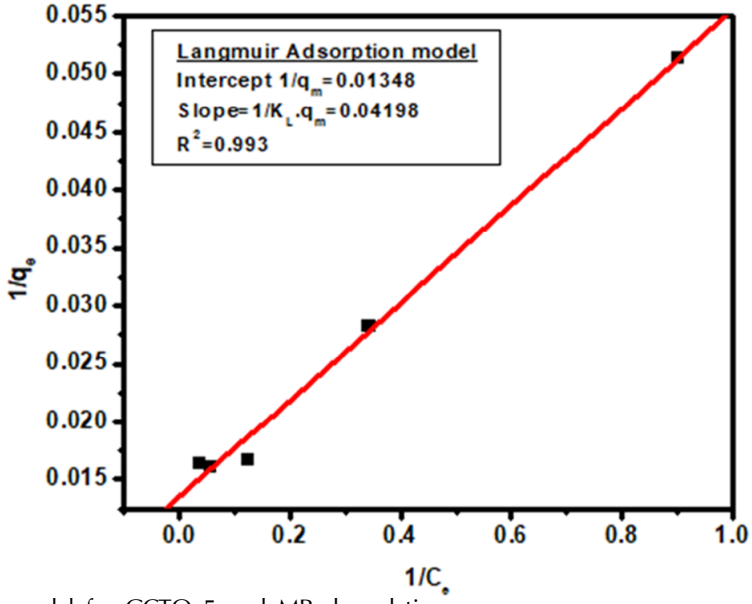

Fig. S8. Langmuir adsorption model for GCTO 5 and MB degradation