Electronic Supplementary Information (ESI) available:

Fig. S1: Calibration curves for change in absorbance of methyl parathion as a function of its concentration and (b) subsequent curve for regression coefficient corresponding to λ = 400 nm

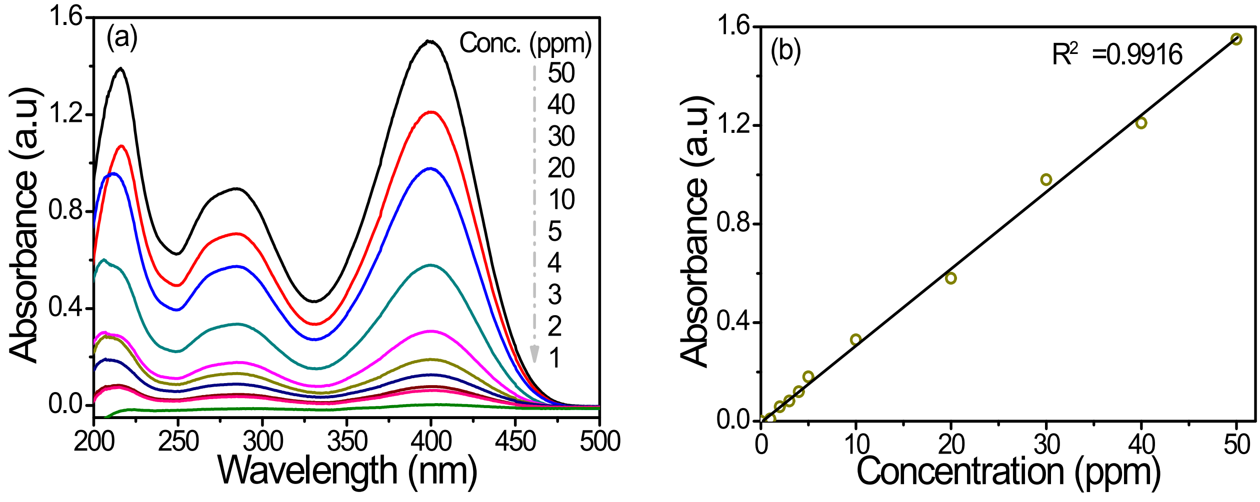

Fig. S2: Comparative XRD pattern for (a) Degussa P25-TiO_2 and (b) after its calcinations at 800 °C.

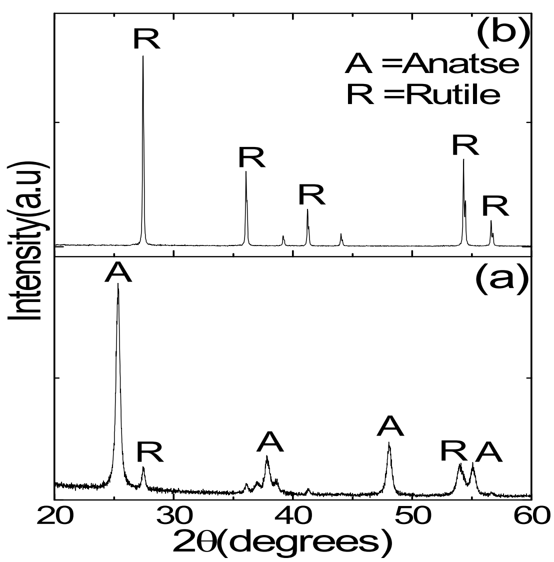

Fig. S3: TEM images for P25-TiO2 (a) before and (b) after calcinations at 800 °C, scale bar is 100 nm

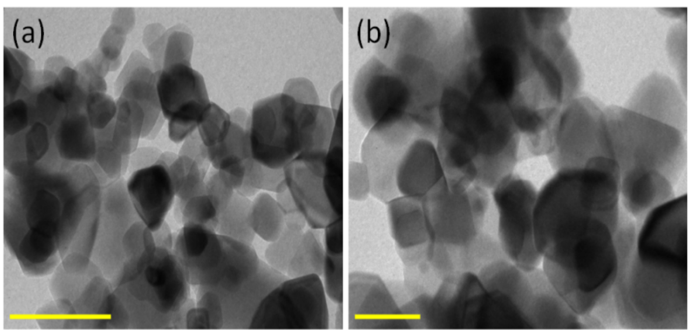

Fig. S4: Kinetics for degradation of the methyl parathion using various TiO_2 catalysts and respective values of apparent rate constant (k, min^{-1})

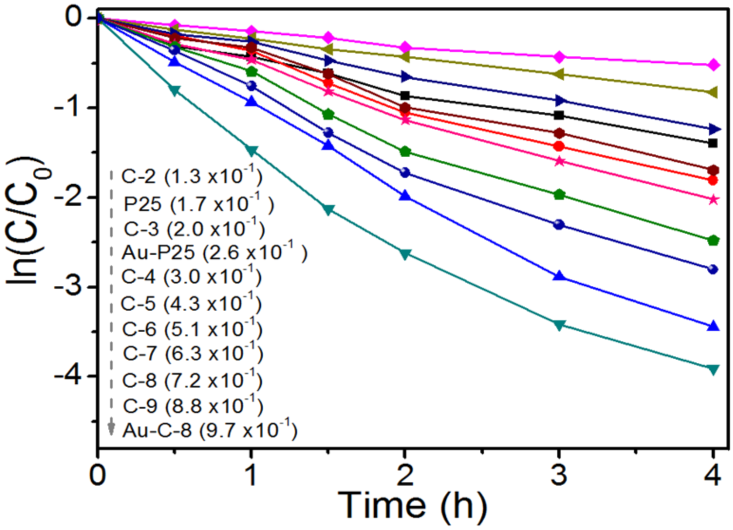

Fig. S5: GC-chromatographs for CO_2 (a) 180 ppm authentic sample and its formation after 240 min of UV-light exposure in presence of (b) P25, (c) P25(R), (d)Au-P25, (e) C-5, (f) C-6, (g) C-7, (h) C-8, (i) C-9 and (j) Au-C-8 catalysts; x and y-axis represents Time (minutes) and response (mV), respectively.

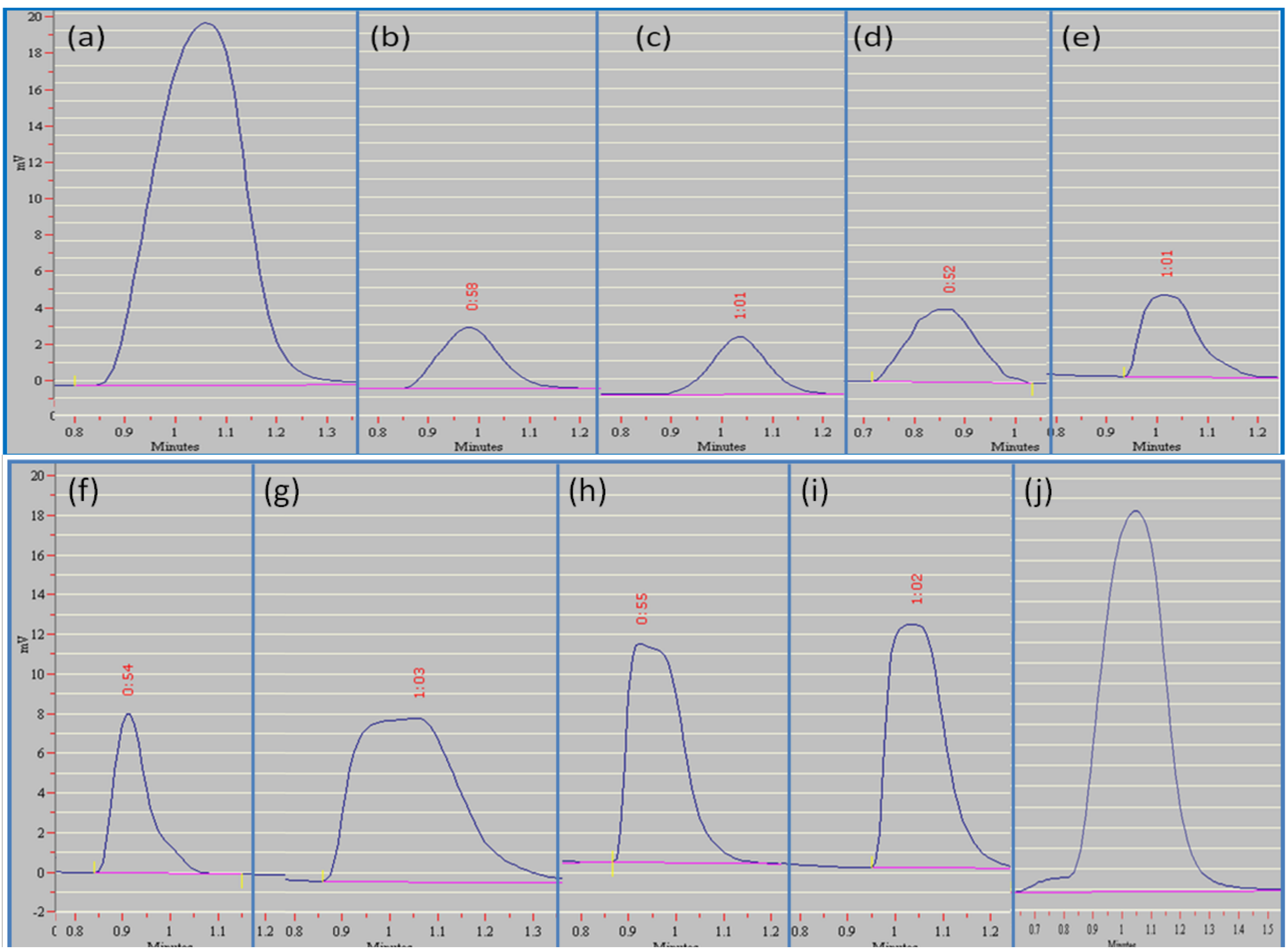

Table 1. Calculation for mass balance of CO_2 formation by photooxidation of methyl parathion using titania catalysts

Initial concentration of methyl parathion applied = 50 ppm or 2.0 mM (exact = 1.9 mM)

Amount of methyl parathion in 5 ml = 10 (μmol)

Complete mineralization proceeds according as given below:

$4\ C8H_{10}NO_5PS + (51)\ O_2 \longrightarrow 32\ CO_2 + 4\ NO_3^- + 4\ PO_4^{-3} + 4\ SO_4^{-2} + 14H_2O + 12\ H^+$

Means, 8 molecule of CO_2 produced by =1 molecule of methyl parathion

Therefore, highest amount of CO2 could be produced = 10×8
= 80 (μ mol)

S.No	Catalyst	Amount of CO_2 produced (ppm) (A)	Amount of CO2 produced in 5ml (μmol) (A)*5/(*44*1000*1000) (B)	Percentage of CO2 formed (B)*100/80
1	Au-C-8	178.9	20.32	25.4
2	C-9	156.2	17.75	22.1
3	C-8	125.3	14.21	17.7
4	P25	20.9	2.35	2.9