Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Information

Non-photochemical catalytic hydrolysis of methyl parathion using core-shell Ag@TiO_2 nanoparticles

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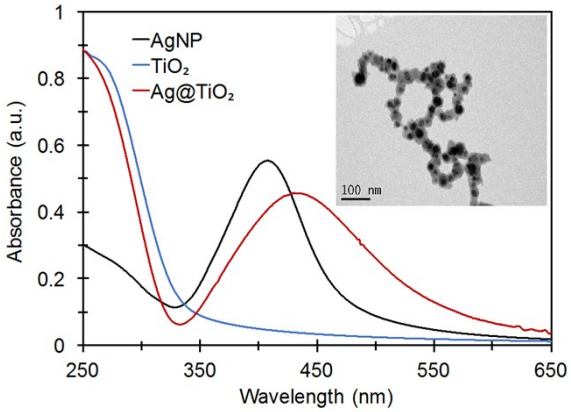

Figure S1. UV-Vis absorption spectra of Ag, TiO_2 and Ag@TiO_2 nanoparticles and TEM image of Ag@TiO_2 (inset).

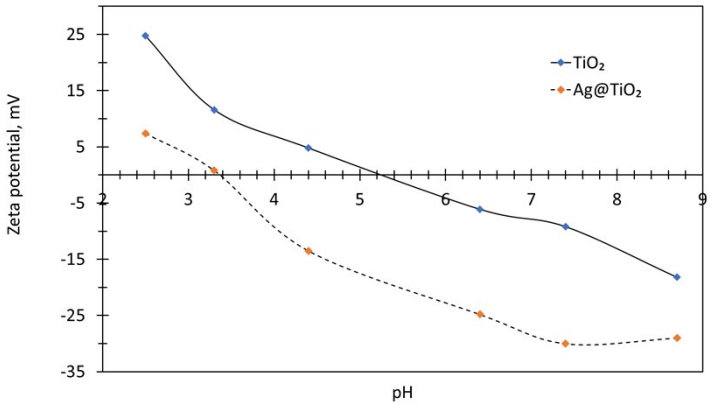

Figure S2. Zeta potential-pH relationship for TiO_2 and $Ag@TiO_2$.

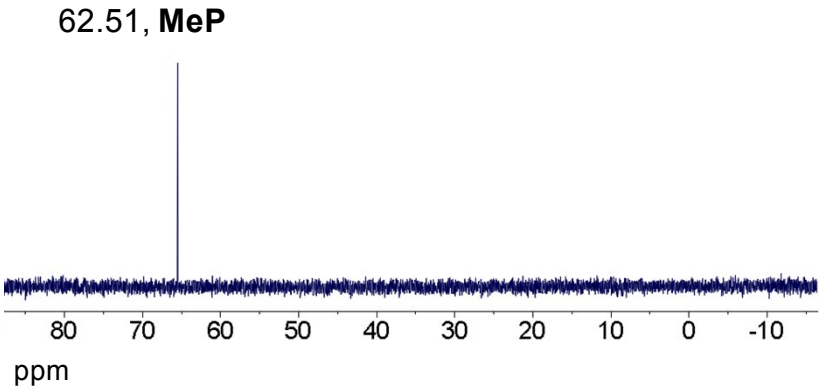

Figure S3. ^{31}P NMR spectrum of methyl parathion after 24 hours (5% MeOH/MOPS, pH = 8.0) (in the absence of $Ag@TiO_2$), δ: 65.51 ppm (MeP). Assignments based on literature values.[1-2]

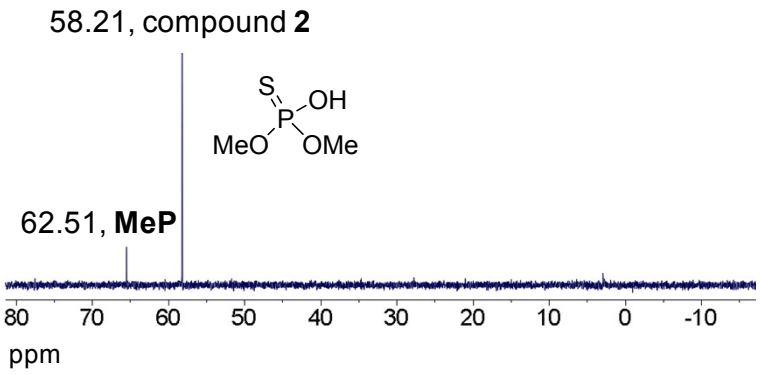

Figure S4. ^{31}P NMR spectrum of methyl parathion + Ag@TiO_2 after 24 hours (5% MeOH/MOPS, pH = 8.0). δ: 65.51 ppm (MeP), 58.21(compound 2, Figure **S1**). Assignments based on literature values.[1-2]

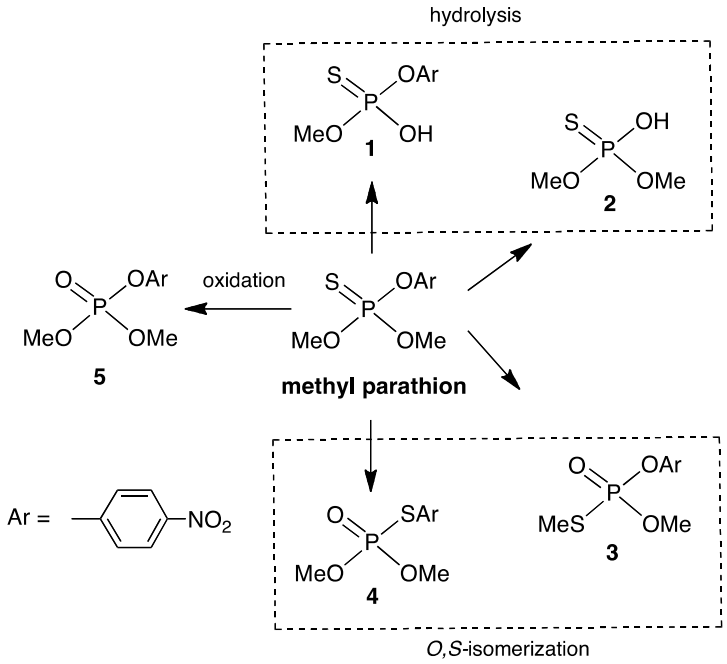

Figure S5. Non-photohemical breakdown products of methyl parathion.

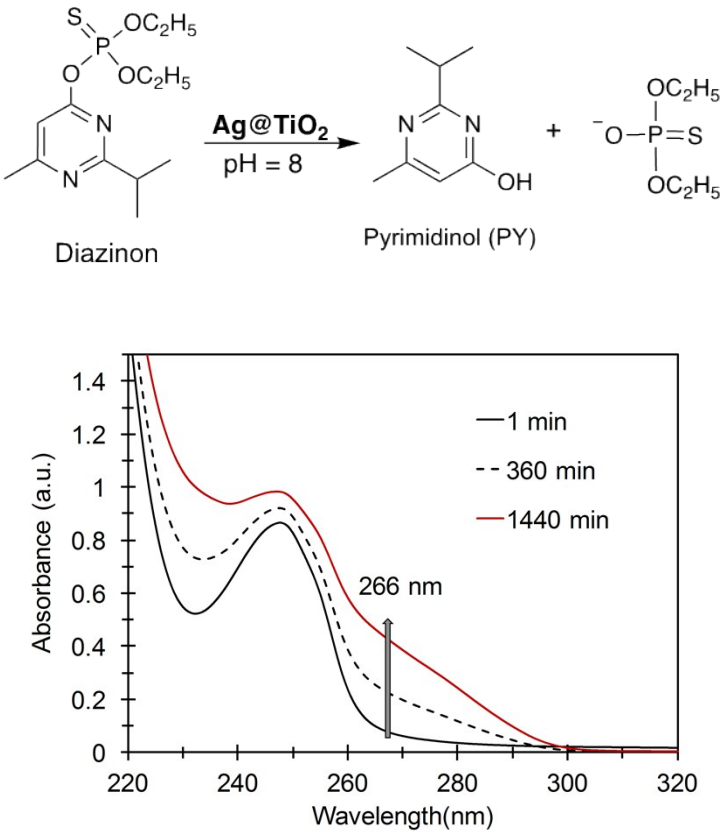

Figure S6. UV-Vis for diazinon + Ag@TiO_2 (5% MeOH/MOPS, pH = 8.0) at different interval times and after removal of the catalyst**.** The spectra of the catalytic mixtures after removal of Ag@TiO_2 showed a constant increase in absorbance at 266 nm indicating an increase in the concentration of pyrimidinol (PY).

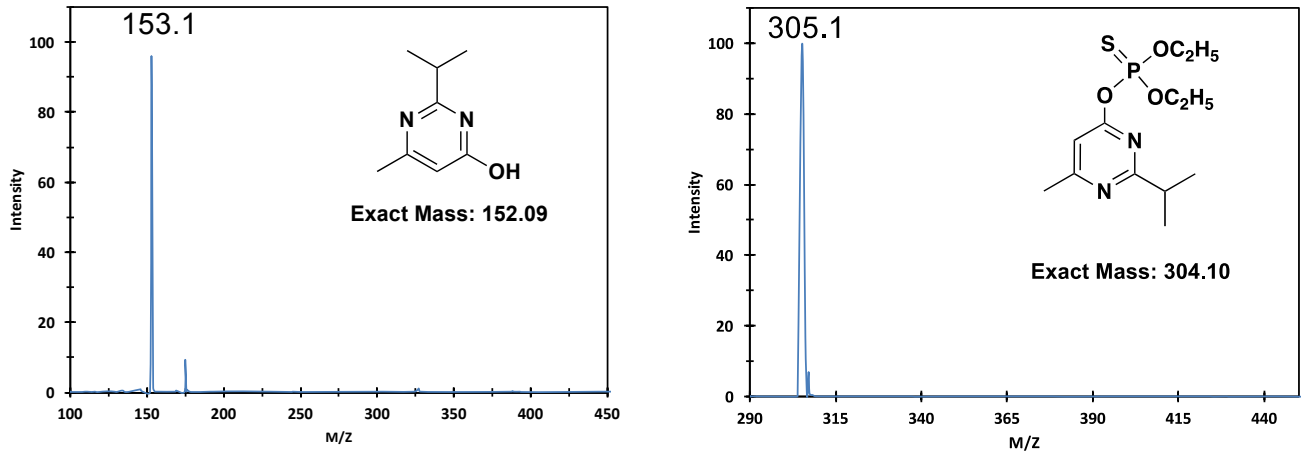

Figure S7. LC-MS analysis of diazinon + Ag@TiO_2 after 24 hours (5% MeOH/MOPS, pH = 8.0). Spectrum from APCI-MS in positive mode, (304.10 *m/z*; Calcd for $[M+H]^+$; 305.1 *m/z*) and product PY (152.09 *m/z*; Calcd for $[M+H]^+$; 153.1 *m/z*).[3]

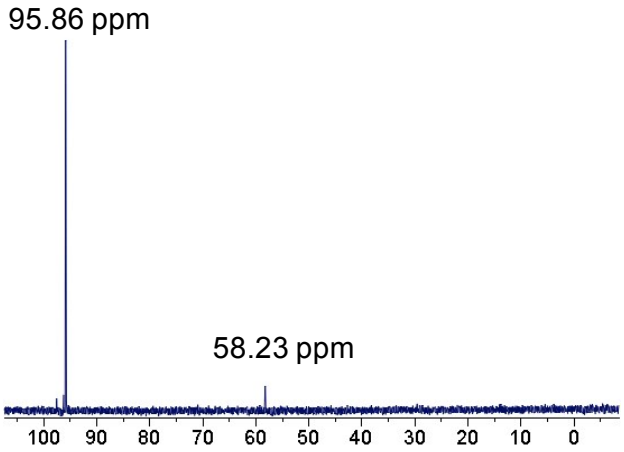

Figure S8. ^{31}P NMR spectrum of malathion + Ag@TiO_2 after 24 hours (5% MeOH/MOPS, pH = 8.0). δ: 95.86 (malathion), 58.23 ([$P(S)(OMe)_2(OH)$]). Assignments based on literature values.[4]

References

1. Lange, L. E.; Obendorf, S. K., *J. Environ. Chem. Eng.* **2015**, *3* (1), 541-547.
2. Seger, M. R.; Maciel, G. E., *J. Environ. Chem. Eng.* **2006**, *40* (2), 552-558.
3. Kouloumbos, V. N.; Tsipi, D. F.; Hiskia, A. E.; Nikolic, D.; van Breemen, R. B., *J. Am. Soc. Mass. Spectrom.* **2003**, *14* (8), 803-817.
4. Koskela, H., *J. Chromatogr. B* **2010**, *878* (17), 1365-1381.