

Supporting Information File 1

for

Twofold role of calcined hydrotalcites in the degradation of methyl parathion pesticide

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1. Experimental

1.1. Hydrotalcite synthesis: Binary hydrotalcites (HTs) containing $Mg^{2+}-Al^{3+}$, $Zn^{2+}-Al^{3+}$, or $Ni^{2+}-Al^{3+}$ with a M^{2+}/Al^{3+} molar ratio of 2/1 were synthesized by coprecipitation [1]. An aqueous solution containing $M^{2+}(NO_3)_2$, (98% Aldrich) and $Al(NO_3)_3$, (99% Aldrich) as

hydrated salts, with a concentration of 2.5 M, and a solution of NaOH (2 M) were added dropwise into a flask at room temperature. An aqueous solution of sodium carbonate (1 M, Na₂CO₃) was also added to the mixture. The rate of addition of the solutions was adjusted in order to obtain a constant pH of 11.5. The mixture was then heated in an autoclave at 80 °C for 24 h. The solids were recovered by decantation and washed with distilled water until the pH of the washing water was 10. The material was then dried in an oven at 70 °C. All HTs were calcined at 500 °C in a furnace for 4 h in order to obtain the mixed oxides.

1.2. Methyl parathion sorption: An aqueous of MP with a concentration of 250 μmol L⁻¹ was prepared and stirred for 24 h until complete dissolution. The pH of the slightly yellow solution was 7.0–7.5. Then 100 mg of mixed oxides, from calcined HT, were placed in a flask containing the MP solution. The mixture was stirred for 0, 5, 10, 40, 120, 1170 or 1200 min at room temperature. The mixed solutions were centrifuged to separate the solid and their absorption spectra were analyzed by UV–vis spectroscopy in the wavelength range from 200 to 550 nm.

1.3. X-ray diffraction: A Bruker-axs D8-advance diffractometer coupled to a copper anode X-ray tube was used to investigate the compounds present in the powdered samples. A diffracted beam monochromator selected the Kα radiation.

1.4. UV–vis spectroscopy: Samples were removed periodically and the degradation ratio of methyl parathion monitored by UV–vis spectroscopy (UNICAM 300 UV–Vis spectrometer).

References

1. Cavani, F.; Trifirò, F.; Vaccari, A. *Catal. Today* **1991**, *11*, 173–301. doi:10.1016/0920-5861(91)80068-K