

## Supporting Information

### Photocatalytic activity of Ag/Al<sub>2</sub>O<sub>3</sub>-Gd<sub>2</sub>O<sub>3</sub> photoatalysts prepared by the sol – gel method in the degradation of 4-Chlorophenol

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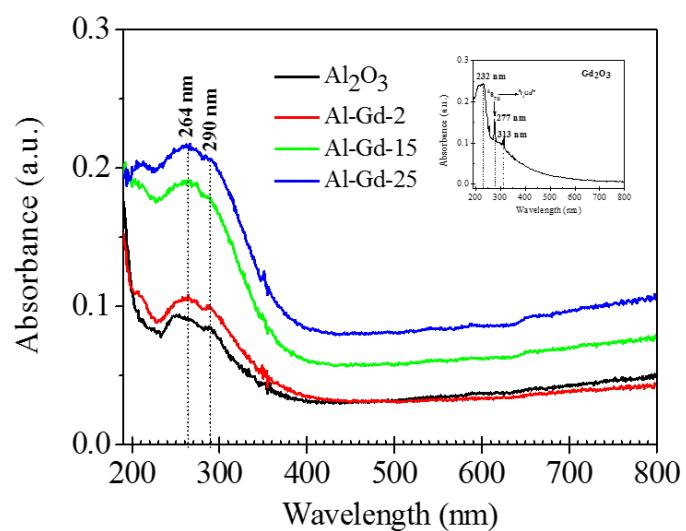
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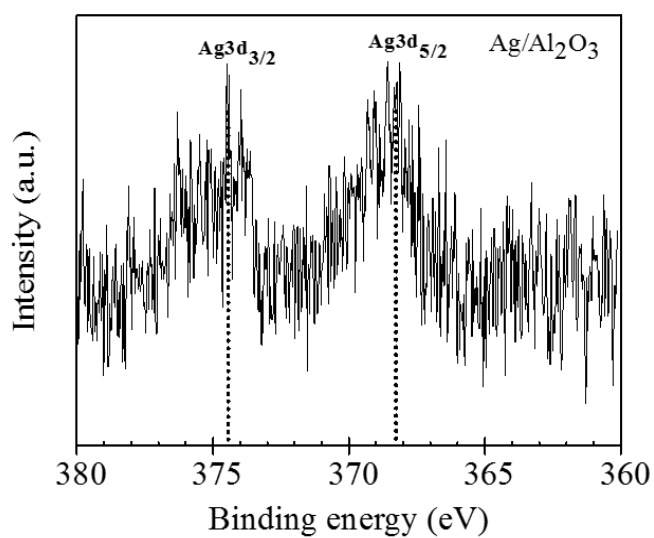
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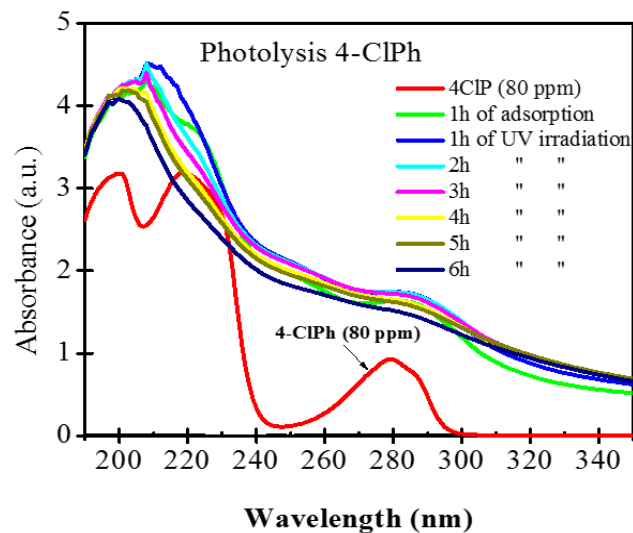
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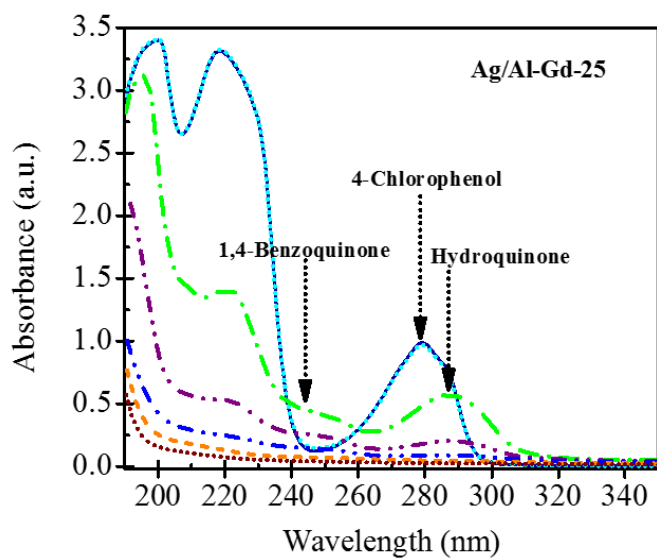
**Figure S1.** UV-Vis spectra of Al-Gd-x composite oxides. Inset: UV-Vis spectra of Gd<sub>2</sub>O<sub>3</sub>.



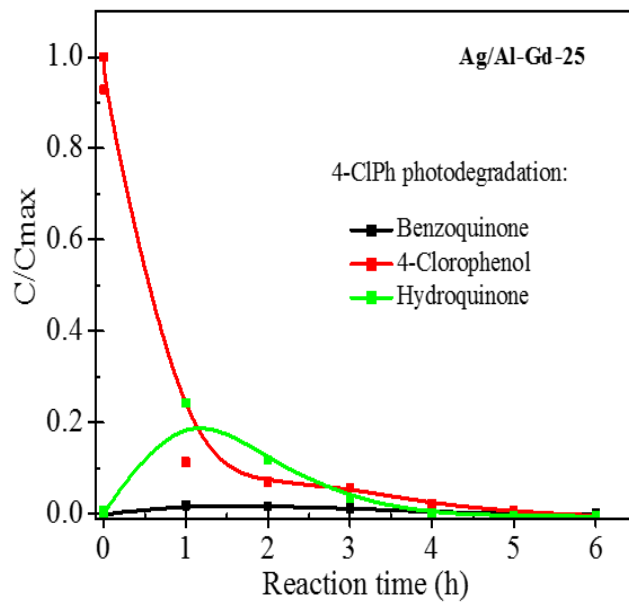
**Figure S2.** XPS Ag 3d spectra of the Ag/Al-Gd-x photocatalysts.



**Figure S3.** Photolysis of 4-Chlorophenol with UV light irradiation.



**Figure S4.** UV-Vis spectra of photodegraded 4-Chlorophenol with UV light using Ag/Al-Gd-25 as photocatalyst; the possible intermediates 1,4-Benzoquinone and Hydroquinone are indicated at the corresponding wavelength as pure compounds.



**Figure S5.**  $C/C_{max}$  vs. reaction time of 4-Chlorophenol, 1,4-Benzoquinone and Hydroquinone after UV light irradiation using the Ag/Al-Gd-25 photocatalyst.

Table S1. Concentration of 1,4-benzoquinone, hydroquinone and phenol as a function of the UV light irradiation time over Ag/Al-Gd-25 photocatalyst.

UV light Irradiation Time (h)	[Benzoquinone] (mol/L)	[4-Chlorophenol] (mol/L)	[Hidroquinone] (mol/L)
0	0.00	6.65E-4	0.00
1	1.20E-5	7.52E-05	1.61E-4
2	1.13E-5	4.69E-05	7.79E-5
3	7.94E-6	3.76E-05	2.22E-5
4	2.57E-6	1.43E-05	2.94E-7
5	9.10E-7	3.75E-06	0.00
6	0.00	0.00	0.00