Support Information

Dependence of the Irradiation Conditions and Crystalline Phase of TiO$_2$ Nanoparticles on their Toxicity to *Daphnia magna*

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Calculation about the Valence Band Edge (Ev) and the Conduction Band Edge (Ec) of Each TiO$_2$ NPs Sample

The energy band gap (E_g) is the energy interval between the valence band edge (E_v) and the conduction band edge (E_c). Hence, the relationship of E_g, E_v and E_c is as follows:

$$E_g = E_v + E_c \tag{S1}$$

Meanwhile, the relationship between the band edge energies (E_v, E_c) and the absolute electronegativity (χ) can be calculated according to the following equation[1]:

$$E_c = -\chi + 0.5\ E_g \tag{S2}$$
$$E_v = -\chi + 0.5\ E_g \tag{S3}$$

The absolute electronegativity of TiO$_2$ is 5.81 eV. Then according to the value of E_g, the value of E_v and E_c can be calculated by equation S2 and S3.
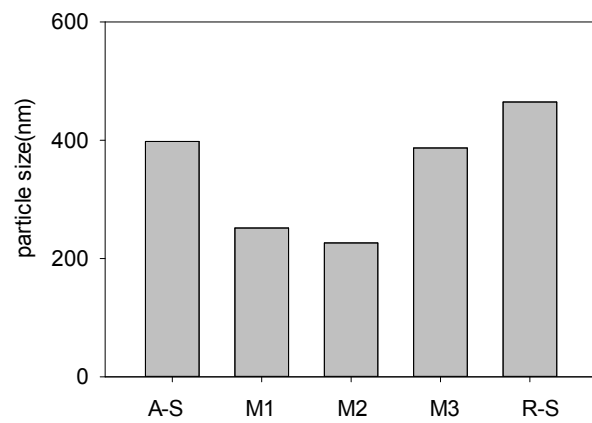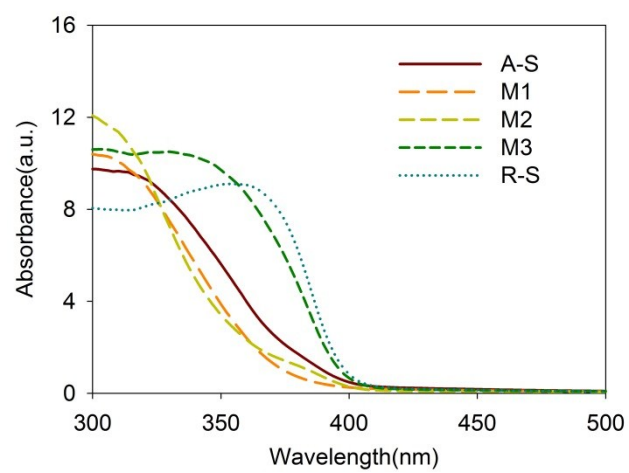
Table S1. Zeta potential of TiO_2 nanoparticles.

Sample	Zeta potential (mV)
A-S	-1.5400
M1	-6.7000
M2	-6.1400
M3	-10.5000
R-S	-6.2900

Figure S1. Average diameters of TiO_2 nanoparticles on the basis of the DLS data.

Figure S2. UV–visible spectra of the five TiO$_2$ nanoparticles.
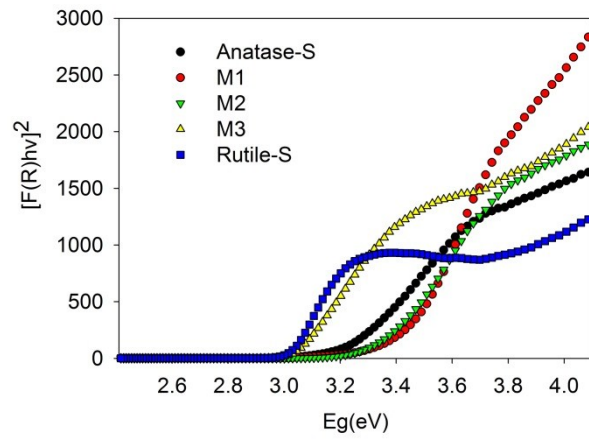
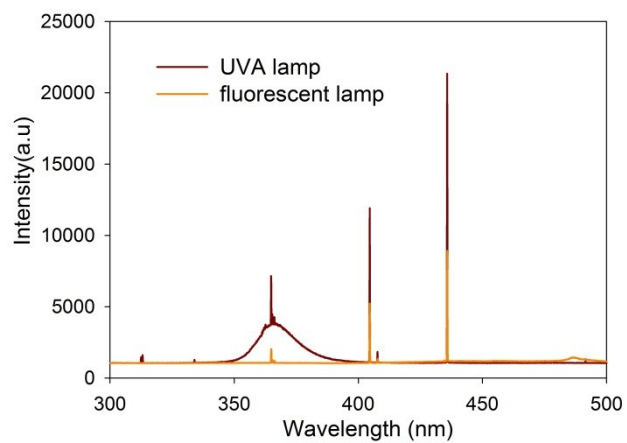Figure S3: Band gap determination using Kubelka–Munk function of the five TiO$_2$ nanoparticles.

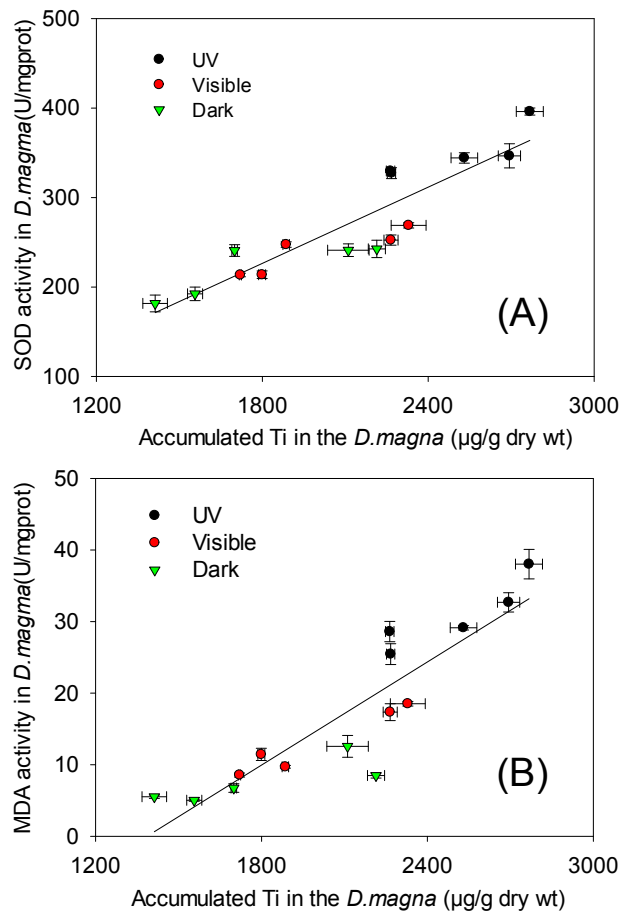Figure S4. Emission spectra of the UVA lamp and fluorescent lamp.

Figure S5. Relationship among SOD (A), MDA (B) and accumulated Ti in *D. magna* after 48 h of exposure to the five TiO_2 nanoparticles. Mean ± standard deviation (*n* = 3).
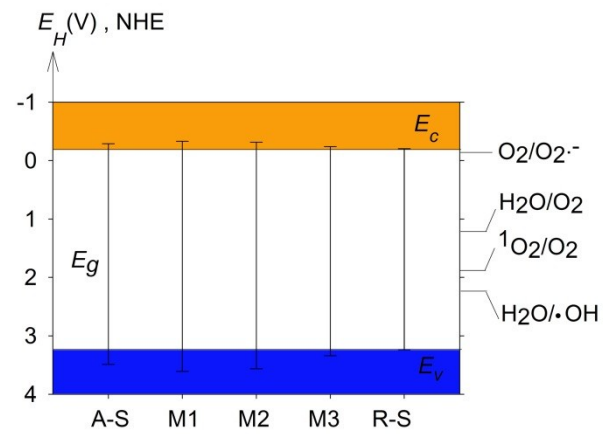
Figure S6. Band edge positions of the five TiO$_2$ nanoparticles in contact with an aqueous solution.

REFERENCES

S1.   Y. Xu and M. A. A. Schoonen, *American Mineralogist*, 2000, **85**, 543-556.