

Supportive information

Synthesis of TiO₂NPs

TiO₂NPs were prepared by solvothermal method [1]. Typically, 20 mL of titanium isopropoxide were added into 100 mL of ultrapure ethanol under constant stirring. Afterward, 5 mL of deionized water was added slowly into the above suspension and stirred for 30 min, and then transferred into Teflon-lined autoclave and heated at 120 °C for 12h. Then, the white solid were collected and washed with deionized water for several times, and dried at 100 °C for 12h. The dried samples were calcinated at 400 °C for 3h with a heating rate of 5 °C/min and labelled as TiO₂NPs.

Synthesis of TiO₂NPs-NH₂

TiO₂NPs were modified with the amine functional group using APTMS as coupling agent [2,3]. Initially, 2.5 g of TiO₂NPs were added into 50 mL of dry toluene together with 4 mL of APTMS and the solution were refluxed for 60 °C for 24 h. Afterward, the white solid were collected by centrifugation and washed three times with acetone-toluene mixture and dried at 50 °C for 12 h and labelled as TiO₂NPs -NH₂.

Instrumentation

The morphology and structure of products were characterized by scanning electron microscopy (JEOL model JSM-6380LV) (the sample was not coated with an additional gold sputtered layer in order to avoid interference), high-resolution scanning transmission electron microscopy (TALOS F200S G2, Thermo Scientific Talos F200S G2). The X-ray diffraction (XRD) patterns were obtained with Thermofisher Scientific Ltd. With the model (ARL EQUINOX 3000). The UV-vis absorption experiments were carried out using a JASCO V-750 Spectrophotometer. The Fourier-transform infrared spectroscopy (FT-IR) (Thermo Scientific, USA) in the range of 4000–500 cm⁻¹ using the KBr pellet technique.

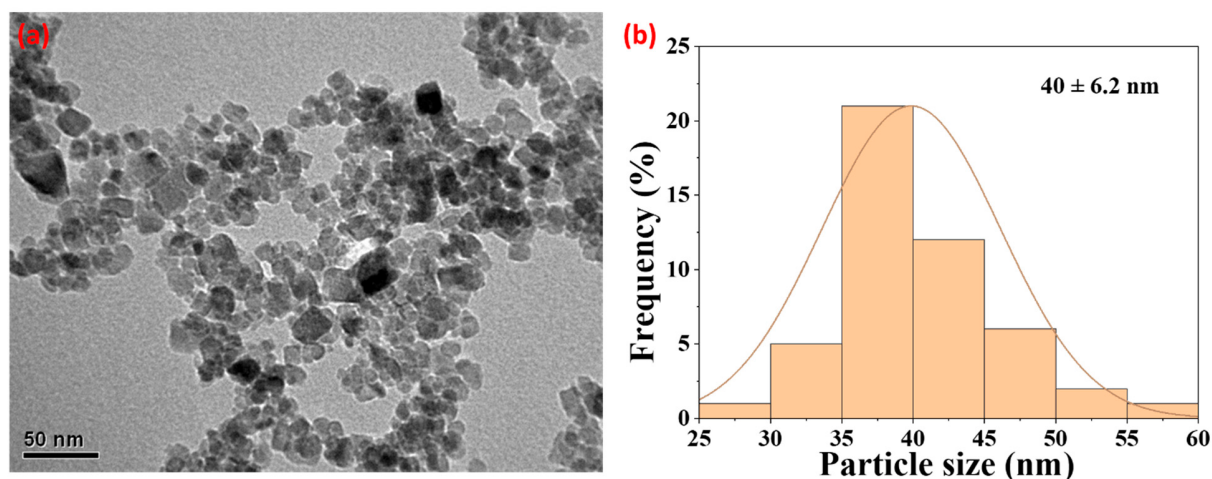


Figure S1. TEM image (a) and histogram (b) TiO₂NPs.

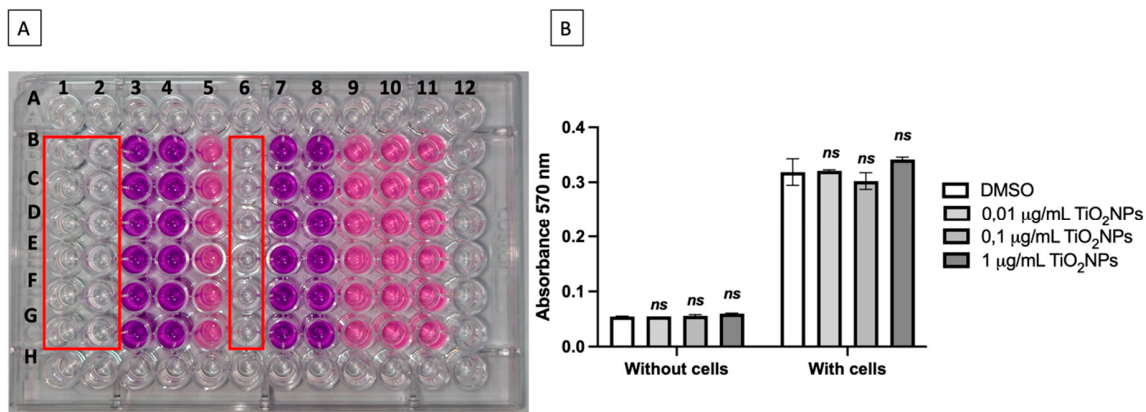


Figure S2. Experimental control for potential TiO₂NPs interference with the MTT assay. (A) Representative 96-well plate showing the experimental layout used to evaluate potential TiO₂NP interference with the MTT assay. Red rectangles indicate blank wells (B1–G1) and wells containing MTT with different concentrations of TiO₂NPs in the absence of cells (B2–G2 and B6–G6). (B) Quantification of absorbance values at 570 nm in cell-free wells and in MCF7 cell-containing wells under the indicated experimental conditions. Data are presented as mean $\pm$ SD. Statistical analysis was performed using one-way ANOVA followed by Dunnett's multiple comparisons test; ns, not significant.

References

1. Vandarkuzhali, S.A.A.; Pugazhenthiran, N.; Mangalaraja, R.V.; Sathishkumar, P.; Viswanathan, B.; Anandan, S. Ultrasmall plasmonic nanoparticles decorated hierarchical mesoporous TiO₂ as an efficient photocatalyst for photocatalytic degradation of textile dyes. *ACS Omega* 2018, 3, 9834–9845.
2. Shanmugaraj, K.; Bedoya, S.; González-Vera, D.; Mangalaraja, R.V.; Vigneshwaran, S.; Díaz de León, J.N.; Herrera, C.; Al-Sehemi, A.G.; Campos, C.H. Palladium nanoparticles immobilized on TiO₂ nanosheets matrix for the valorization of furfural to produce tetrahydrofurfuryl alcohol. *J. Environ. Chem. Eng.* 2024, 12, 113442.
3. Shanmugaraj, K.; Mangalaraja, R.V.; Campos, C.H.; Singh, D.P.; Aepuru, R.; Thirumurugan, A.; Gracia-Pinilla, M.A.; Shaji, S. Gold nanoparticles decorated two-dimensional TiO₂ nanosheets as effective catalyst for nitroarenes and rhodamine B dye reduction in batch and continuous flow methods. *Inorg. Chem. Commun.* 2023, 149, 110406.