

# Transport of TiO<sub>2</sub> nanoparticles through water saturated packed columns

V. Sygouni<sup>1\*</sup>, D. Vassilopoulos<sup>1</sup>, I.D. Manariotis<sup>1</sup> and C.V. Chrysikopoulos<sup>2</sup>

<sup>1</sup>Environmental Engineering Laboratory, Civil Engineering Department, University of Patras, 26504 Patras, Greece

<sup>2</sup>School of Environmental Engineering, Technical University of Crete, 73100 Chania, Greece

\*Corresponding author: E-mail: sygouni@upatras.gr, Tel +30 2610 996534, Fax: +30 2610 996573

## Abstract

In this work, various TiO<sub>2</sub> NP suspensions were prepared using different preparation techniques. Rutile-anatase and anatase TiO<sub>2</sub> NPs were used for the preparation of aquatic NP suspensions at various concentrations. Measurements of particles size and zeta potential were performed in order to investigate the effect of sonication and aging on nanoparticle agglomerates. Finally, transport experiments of TiO<sub>2</sub> NP solutions in packed columns were performed for varying TiO<sub>2</sub> concentrations. The concentration and size of the NPs were measured at the outlet of the column. It was observed that a substantial percentage of the NPs injected into the experimental column were retained in the column packing.

*Keywords: titanium oxides, nanoparticles, transport, particle size, porous media.*