Cyclophosphamide (CP) and Ifosfamide (IF) are commonly prescribed cytostatic drugs that have cytotoxic, genotoxic, mutagenic, carcinogenic and teratogenic effects on living organisms, which asks for their removal from water sources. The photocatalytic degradation of CP and IF under UV-VIS irradiation was studied, using various TiO_2 based materials like powders (undoped or doped with Fe, Ni, Co, S) and films on glass surfaces synthesized by vacuum deposition (with and without Ag or N dopants). CF and IF were analyzed using gas chromatography after derivatization with trifluoroacetic anhydride in toluene.
For undoped TiO_2 used as powder, optimal degradation was obtained using 400mg/L TiO_2 and irradiation time 180 min(CF) or 360 min (IF) at neutral pH, by a preudo-first order kinetics. $HO^{\bullet}$ attack on CF secondary amine group was observed as a primary degradation pathway, along with a direct attack on the heterocycle, with generation of six intermediates, identified by LC-MS/MS. For TiO_2 films on glass support, best results were obtained with TiO_2 films with 300nm thickness, heat-treated at 450ºC for 1h. Using 1%Ag-doped TiO_2 was observed as optimal for CF degradation, with ≥ 99% efficiency after 120 min irradiation time and a degradation rate constant $k_{CP} = 6.59 \times 10^{-4} s^{-1}$. Based on the results of the quenching experiments in the presence of suitable scavengers, a mechanism of photocatalytic degradation of CP has been proposed. This consists in the attack of free hydroxyl radicals and superoxide radicals on the pollutant. Also, the contribution of Ag to inhibition of charge recombination and the additional generation of superoxide radicals, which are responsible for the higher photocatalytic activity of Ag-doped TiO_2 compared to N-doped TiO_2 and undoped TiO_2 was emphasised.

Keywords: *cyclophosphamide, ifosfamide, Ag-doped TiO_2, N-doped TiO_2, photocatalysis, degradation mechanism*