# New Silica Supported Titanium Dioxide Catalysts: Characteristics and Photocatalytic Efficiency in Waste Water Depollution

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Silica gel supported titanium dioxide photocatalysts were prepared by sintering $TiO_2/SiO_2$ mixtures under variations of $TiO_2$ content, calcination temperature and calcination time. The method allowed to obtain catalyst samples, which can be used in aqueous suspension and which were found to be easily separated by decantation after the photocatalytic treatment. The photocatalytic efficiency of the catalysts was tested by carrying out the photooxidation of the textile dye Acid Red 88 (AR88) in aqueous solution, used as "model" water pollutant. The obtained photoefficiency results were correlated to catalyst physicochemical characteristics, as determined by Inductively Coupled Plasma (ICP) analysis, X-ray diffraction, specific surface area (BET) and scanning electron microscopy (SEM). No positive correlation has been observed between titanium dioxide content and photocatalytic efficiency. The decrease of photocatalytic activity at high calcination temperature (1000 °C) is attributed to the phase transition anatase/rutile as well as to the decreasing specific surface area. According to SEM analysis, no significant fixation of $TiO_2$ on silica is observed for catalysts prepared at low temperature (400 °C). The observed photocatalytic activity is consequently due to free $TiO_2$ particles. The best efficiency is observed for photocatalyst prepared at 800 °C and containing around fifty percent titanium dioxide.

*Key words:* Silica, Titanium Dioxide, Photocatalysis, Depollution