

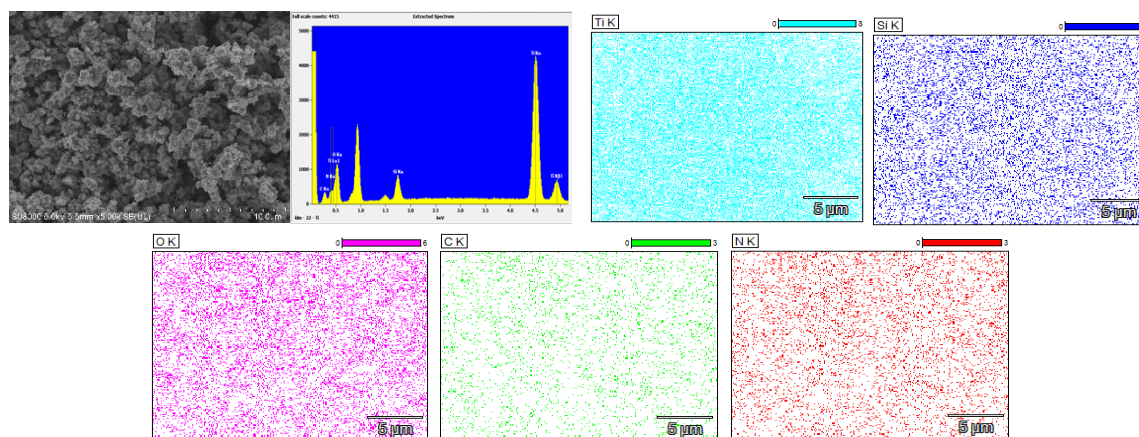
# TiO<sub>2</sub>/Silane Nanomaterials with Enhanced Photocatalytic Properties

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Titanium dioxide as the photocatalyst has attracted significant attention from many researchers due to their properties such as low cost, chemical and physical stability and non-toxicity. Titanium dioxide is the most popular and widely studied photocatalyst for water and air pollutant decomposition. In order to improve the photocatalytic activity, different modifications of titania have been carried out, modification with metals or non-metals. Using of silicon is a very promising way for the surface modification of TiO<sub>2</sub>. It is known that Si-doped TiO<sub>2</sub> enhances the specific surface area, decreases the particles size and suppresses the phase transformation from anatase to rutile. Additionally, the presence of Ti–O–Si bands in the TiO<sub>2</sub> structure promotes the formation of reactive oxygen species, as well as, increases the mobility of lattice oxygen, what influence changes of the electron band structure of TiO<sub>2</sub>.

In this work, we reported a study on TiO<sub>2</sub> nanoparticles modification with silicon. TiO<sub>2</sub>/silicon photocatalysts were calcined at different temperature in a constant Ar flow. Physicochemical properties of tested composites were determined by means of UV-vis/DRS, XRD and SEM analysis. The BET specific surface area ( $S_{BET}$ ) and the total carbon content were also measured. The photocatalytic activity of the obtained nanomaterials was measured by the degradation of methylene blue solution under UV-vis (with high intensity of UV) and visible light (with a small component of UV light). Modification with silicon affected the changing of photocatalysts properties, hence, the The photocatalytic activity of tested photocatalysts was higher in comparison with unmodified TiO<sub>2</sub>.



*Figure 1.* SEM and EDX images of example TiO<sub>2</sub>/silicon photocatalyst

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