

Synthesis and characterization of anti-microbial Ag-TiO₂ nano composite particles and their coatings onto 3-D filters

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TiO₂ is an environmentally benign material and it has also remarkably photocatalytic activity and anti-microbial efficiency. It's because TiO₂'s photocatalytic activity works under UV irradiation, metal nano particles doped TiO₂ has attracted the attention in the past decades. Metal ions could improve the photocatalytic activity of TiO₂ nano particles. Silver is one of the most appropriate metallic nano particles in order to help increase TiO₂'s anti-microbial efficiency as well as its photocatalytic activity. The aim of this study is to produce Ag-TiO₂ nano composite particles using hydrothermal synthesis (HS) at 180°C for 2 h and to compare those nano particles with the pure TiO₂ in terms of microstructural properties and antimicrobial efficiency. Initially TiO₂ was synthesized and then Ag nanoparticles were dopped onto the TiO₂ particles during HS. TTIP was used as a precursor for the pure TiO₂ synthesis. It took 24 hours to produce with the help of magnetic stirring as a transparent solution. Afterwards Ag nano particles were dopped onto the TiO₂ during HS with the help of AgNO₃ and reducing agent PVP. SEM images help in order to understand nano particles' both shape and sizes. TEM micrographs on the other hand, show that Ag nanoparticles have spherical shape with a diameter of 10 nm and the size of TiO₂ nanoparticles which Ag located around were 40 nm. After the production of nano particles, they were used to obtain stable colloidal suspensions. Subsequently, Ni based 3-D filters were coated using electrophoretic deposition (EPD) with the help of those suspensions. As an optimum condition 30V for 5 min. was chosen. Finally, the antimicrobial effect of both nano particles and coatings are discussed with reference to the antimicrobial efficiency tests.

Biography

Cansu Noberi has completed her master at the age of 24 and since she is a PhD candidate at Yildiz Technical University. She also works in the same university as a research assistant since February, 2011.

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