

Biosynthesis of TiO₂ nanoparticles from alfalfa extracts

José de Jesús Ibarra-Sánchez¹, Guadalupe de la Rosa Álvarez^{1,2}, Rosalba Fuentes-Ramírez¹, Susana Figueroa-Gerstenmaier², Adolfo Melitón Espíndola González¹, José Antonio Reyes-Aguilera², Ramón Castañeda Priego³ and José Jorge Delgado García²

¹Departamento de Ingeniería Química, División de Ciencias Naturales y Exactas, Campus Guanajuato, Universidad de Guanajuato, México

²Departamento de Ingenierías Química, Electrónica y Biomédica, División de Ciencias e Ingenierías, Campus León, Universidad de Guanajuato, México

³Departamento de Ingeniería Física, División de Ciencias e Ingenierías, Campus León, Universidad de Guanajuato, México

In this work, we present the green synthesis of TiO₂; focusing on several effects that impact the particle size distribution: an initial concentration of precursor (titanium isopropoxide), the ratio of hydrolysis, and different pH values. Nanoparticles were synthesized from a hydrolysis reaction using 2-propanol as a solvent; starting from titanium isopropoxide and sugars and carboxylic acids as additives extracted from alfalfa. The extraction of these additives was obtained by dissolving powdered alfalfa in 2-propanol. This substrate has been harvested in the southern region of the city of Leon, Guanajuato in Mexico. Figure 1 shows the onset wavelength of the optical absorption for the uncapped TiO₂ that appears at 290 nm in UV-Vis spectroscopy which is blue shifted compared to the bulk anatase TiO₂; indicating the formation of nanoparticles solution. Moreover, the spectrum gives an indication about nanoparticle polydispersity: systems with low polydispersity present a well-defined peak, as shown in this figure.

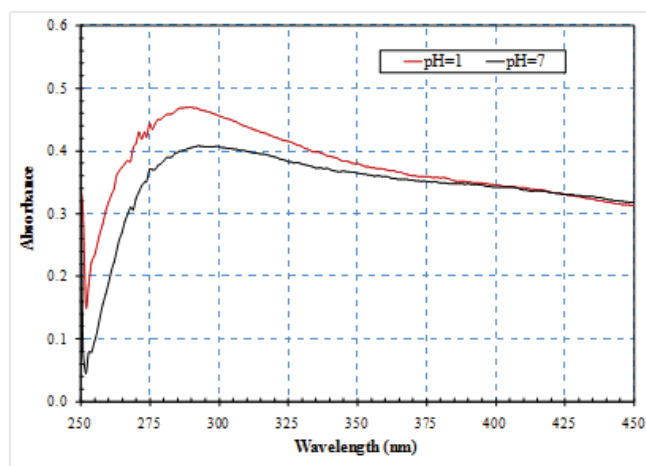


Figure 1. UV-Vis spectrum for TiO₂ nanoparticles synthesized at different pH.

Biography

Jose de Jesus Ibarra-Sanchez has completed his Master's in Chemical Engineering from the University of Guanajuato, Mexico. Since 2011, he is a Ph.D. Student at the same university. He has published two papers.

chuy_lindo3@hotmail.com