

MnO₂ AND CrO₂ DOPANTS DROP THE ELECTRICAL CONDUCTIVITY OF TiO₂ AND QUENCH ITS PHOTOCATALYTIC ACTIVITY. Jonathan Shute^{1,2}, Jorge Torres^{1,2}, Patricia Barreto^{1,3}, James Sweeney^{1,2}, Vincent Rosa^{1,2}, Strnad, Jessica^{1,3}, Herscher, Megan^{1,3}, Paulo Leon-Silva^{1,2}, Branko Bulakovski^{1,2}, Jose Barreto^{1,3}, Green Technology Research Group (GTRG)¹, Departments of Bioengineering² and Chemistry³, Florida Gulf Coast University, 10501 FGCU Boulevard South HE331, Fort Myers, FL 33965.

Titanium oxide (TiO₂) is a semiconductor material with high photocatalytic activity. An electron can be promoted into the conduction band via the absorption of a UV photon, where this excited electron leads to the photocatalytic destruction of molecules. We have been using TiO₂ coatings aimed at destroying toxins that come in contact with them by the process of photocatalysis. Dopants can be added to the coatings with the goal of enhancing photocatalytic activity. Many of these dopants, however, may partially or totally reduce this activity. We have observed in previous studies that manganese oxide and chromium oxide, used as dopants, quench the photocatalytic ability of TiO₂. We measured the electrical currents through these doped coatings in response to various applied voltages and found a significantly reduced electrical conductance. Electrical conductivity of this type of doped materials could potentially be used as an indicator of photocatalytic activity.