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Evidence of iridescence in TiO₂ nanostructures. A probably photonic effect RAFAEL REY-GONZALEZ¹, HEIDY P. QUIROZ², CLAUDIA BARRERA-PATIO³, ANDERSON DUSSAN⁴, Universidad Nacional de Colombia, GRUPO DE OPTICA E INFORMACION CUANTICA COLLABORATION, GRUPO DE MATERIALES NANOESTRUCTURADOS Y SUS APLICACIONES COLLABORATION — In this work, we present a study of optical properties of titanium dioxide nanotubes (TiO₂). Nanotubes were obtained by electrochemical anodization method, using ethylene glycol solutions containing different amounts of water and fluoride. A complex structure is observed between nanotubes and Ti foils on surface when nanotubes are released from the sheet. These forms can be associated with replicas or marks in surface of the Ti foil. The optical response of replicas is studied by Uv-Vis spectrophotometry using white light and varying the angle of the incident light. Absorbance measurements reveal that these replicas exhibit a shift towards lower values of lambda when the angle of the incident light increases of 20° to 60°. These changes may be associated with iridescent effects in this material. The concavity of the replicas in association with air could be generating photonic-like effects. Using a 2D model of replicas - air system, the photonic band structures are found through a plane wave approach. Correlations between photonic properties and iridescent effects are explored.

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