19. **Optimization and Characterization of Anatase Formed on Anodized Titanium in Sulfuric Acid**

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**Abstract**

Anodic oxidation is used to modify the surface of pure titanium in a sulphuric acid electrolyte in order to maximize and characterize the TiO\(_2\) anatase crystalline phase. In the present work, thick films of the anatase polymorph of TiO\(_2\) were formed on commercially pure Ti foil under potentials 100V-140V at current densities 40 and 60 mA/cm\(^2\) for 10 min. Multiple characterisation techniques were used and found that the maximum level of significantly formed anatase intensity where no significant rutile formation is observed at potential 140 V according to X-ray diffraction (XRD) analysis. Field Emission Scanning Electron Microscope (FESEM) images have shown porous surfaces as the applied voltage increased. Water contact angle (WCA) values observed hydrophilicity on the coated surfaces with samples anodized at 120 V have the highest wettability. It can be concluded that the highest amount of anatase before rutile threshold in sulfuric acid is observed under voltages 140 V and below.

**Keywords:** Titanium; Anodic Oxidation; Anatase; Surface Modification; WCA.

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