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## HEXAGONAL TiO<sub>2</sub> NANOTUBES: FORMATION AND CHARACTERIZATION

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The research focused on the synthesis and detailed analysis of hexagonal titanium dioxide nanotubes (hTNTs), particularly examining their structural, electrochemical, corrosion resistance, and mechanical characteristics. hTNTs were produced using a sonoelectrochemical anodization process applied to titanium foil, employing different electrolytes to achieve varying titanium oxide morphologies. Electrochemical analysis demonstrated that hTNTs exhibited a more positive open-circuit potential, reduced impedance, enhanced electrical conductivity, and a higher corrosion rate in comparison to compact TiO<sub>2</sub>. Nanoindentation testing showed that the mechanical properties of hTNTs were dependent on their diagonal size, with hardness and Young's modulus decreasing as diagonal size increased, alongside greater plastic deformation.

In conclusion, the results indicate that hTNTs possess favorable structural and electrochemical attributes, positioning them as promising candidates for a range of applications, such as biosensor platforms.