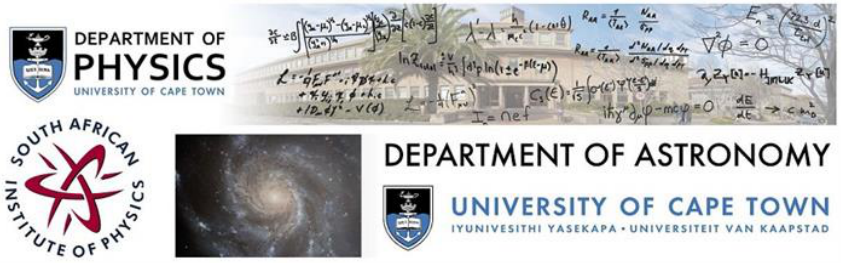

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Synthesis and characterization of Titanium dioxide nanotubes using electrochemical anodization system for solar cell application.

Tuesday, 5 July 2016 15:00 (20 minutes)

Abstract content
   (Max 300 words)
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The study reveals the synthesis and characterization of Titanium dioxide nanotubes (NTs) using electrochemical anodization. Titanium dioxide NTs were fabricated using ethylene glycol containing ammonium fluoride at different anodization periods (1 hr, 2 hrs, 3 hrs, 4 hrs, 5 hrs, 6 hrs, 8 hrs, 10 hrs and 12 hrs) at a constant voltage of 10 V. The fabricated Titanium dioxide nanotubes were characterised by SEM, XRD, RS and HRTEM. SEM analysis has shown that the fabricated nanotubes have different morphologies that vary with anodization time. XRD analysis revealed that the fabricated nanotubes are polycrystalline consisting of Brookite and Anatase phases. The X-ray diffraction (XRD) patterns of Titanium dioxide nanotubes were in good agreement with the standard x-ray diffraction of the (ASTM) data of Anatase and Brookite phases of Titanium dioxide. The dominant peaks at two-theta degree of 38.7 ° and 77.6 ° which represent the Miller indices of (004) and (031) planes, respectively correspond to the crystalline structure of the pure Anatase phase of Titanium dioxide. Then the other peaks characteristic located at 35.3°, 40.3°, 53.2°, 63.1°, 70.8°, 76.3° and 77.5° two-theta degree, representing the hkl Miller index (002), (202), (222), (610), (413), (204), and (133), respectively, correspond to pure Brookite phase of Titania. RS analyses have revealed that the fabricated Titanium dioxide NTs Anatase with peaks at 154, 199, 406 and 614 per cm, can be seen in the range of 100 to 700 per cm Furthermore structural properties were evaluated by HRTEM. Optical and electronic properties were evaluated by UV-Vis and 4 point probe (I-V characterization) .

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Main supervisor (name and email)
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