

## Synthesis of TiO<sub>2</sub> Anatase and Rutile Nanorod for using as an electron transport material in Provkite Solar Cells

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### Abstract

Titanium dioxide (TiO<sub>2</sub>) is used as electron transfer layer in perovskite Solar cells. According to their different nanoscale TiO<sub>2</sub> structures, it has been determined that 1D structures such as nanorods, nanotubes and nanowires has better properties than the other structures by enhancing electron transport and create an offered directional way of transporting of the electrons. From these TiO<sub>2</sub> structures, TiO<sub>2</sub> nanorods have special importance because of less defects related barriers blocking the charge carrier transport that may effect on transporting properties. the length of nanorods is a key factor influencing the charge collection efficiency. So in this paper hydrothermal synthesis of TiO<sub>2</sub> has been studied as it can be used as an electron transport layer instead of materials such as meso-porous TiO<sub>2</sub> or TiO<sub>2</sub> nanoparticles. For this purpose, different factors have been studied such as time and temperature of synthesis and concentration of raw materials. Temperatures of 130, 150 and 170°C and time of 3, 7 and 12 hours have been chosen. At last with studying and evolution of morphology and structure and carrier transport longs without recombination, the optimized state of synthesis have been offered.

**Keywords:** Solar cells, Hydrothermal, Synthesis, Nanorods, TiO<sub>2</sub>

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