Nanocrystalline titanium oxide electrodes for photovoltaic applications

A respectable photovoltaic efficiency (i.e., 10%) is obtained by the use of mesoporous, nanostructured films of anatase particles. We will show how the TiO 2 electrode microstructure influences the photovoltaic response of the cell. More specifically, we will focus on how processing parameters such as precursor chemistry, temperature for ...

1.. IntroductionNanocrystalline titanium oxide (TiO 2) is highly attractive as an electron transport layer materials in photovoltaic (PV) devices, because it has been used as a photocatalyst and is an n-type electrode in dye-sensitized photo-electrochemical solar cell.Therefore, hybrid polymer/TiO 2 PV devices have been under intense investigation and a ...

Ion-irradiation of titanium oxide (TiO2) nanoparticles is shown to result in the merging of the nanoparticles to form continuous chains of different shapes and dimensions, including one ...

Fluorine-doped tin oxide (FTO) conducting glass substrates were treated with TiO x or TiCl 4 precursor solutions to create a blocking layer before tape casting the SnO 2 mesoporous anode. In addition, SnO 2 photoelectrodes were treated with the same precursor solutions to deposit a TiO 2 passivating layer covering the SnO 2 particles.

O''Regan B, Grätzel M. A low-cost, high effiency, solar cell based on dye-sensitized TiO 2 film. Nature, 1991, 353: 737-739. Article Google Scholar . Barbé CJ, Arendse, F, Comte P, Jirousek, M, Lenzmann F, Shklover V, Grätzel M. Nanocrystalline titanium oxide electrodes for photovoltaic applications.

Nanocrystalline Titanium Oxide Electrodes for Photovoltaic Applications," J. Am. Ceram. Soc. ... Application of Poly(3,4-Ethylene Dioxythiophene) to Counter Electrode in Dye-Sensitized Solar Cells ... 0366-7022, 31, pp. 1060 - 1061. Crossref. Search ADS 11. Kay, A., and . Grätzel, M., 1996, " Low Cost Photovoltaic Modules Based on Dye ...

Synthesis methods, shape and size of the nanocrystalline titanium dioxide (TiO 2) are very crucial parameters for the power conversion efficiency of dye sensitized solar cells this article, nanoparticles of TiO 2 powders have been synthesized via flame spray pyrolysis and hydrothermal sol-gel methods. These powders have been characterized by X-ray diffraction ...

DOI: 10.1155/2011/539382 Corpus ID: 55968922; Novel Approach for the Synthesis of Nanocrystalline Anatase Titania and Their Photovoltaic Application @article{Srinivasu2011NovelAF, title={Novel Approach for the Synthesis of Nanocrystalline Anatase Titania and Their Photovoltaic Application}, author={Pavuluri Srinivasu and Surya ...

This investigation introduces an innovative approach to microwave-assisted crystallization of titania

nanoparticles, leveraging an in situ process to expedite anatase crystallization during ...

Such materials will open up the possibilities for investigating the predicted unique properties and applications of nanocrystalline 2D ... titanium oxide electrodes for photovoltaic applications. ...

A respectable photovoltaic efficiency (i.e., 10%) is obtained by the use of mesoporous, nanostructured films of anatase particles. The authors show how the TiO{sub 2} electrode ...

The electronic structure of nTi-MOF ETL is found to be suitable for charge injection and transfer from the perovskite to the electrodes. The combination of a [6,6]-phenyl-C 61 ...

[16] Barbe C J et al 1997 Nanocrystalline titanium oxide electrodes for photovoltaic applications J. Am. Ceram. Soc. 80 3157-71. Crossref; Google Scholar [17] Lampert C M, Omstead T R and Yu P C 1986 Chemical and optical-properties of electrochromic nickel-oxide films Sol. Energy Mater. 14 161-74. Crossref; Google Scholar

Using the pre-treatment of the working photoelectrode and the admixture light-scattering layer can ameliorate the performance of TiO2 dye-sensitized solar cells (DSSCs). TiCl4 treatments on TiO2 electrodes improve the adhesion and mechanical strength of the TiO2 layer. The HNO3 treatment significantly enhances the dispersion of TiO2 particles and increases the ...

Nanocrystalline titanium oxide (TiO 2) is highly attractive as an electron transport layer materials in photovoltaic (PV) devices, because it has been used as a photocatalyst and is an n-type electrode in dye-sensitized photo-electrochemical solar cell.

Post-treatment of titanium dioxide (TiO2) films for use in dye-sensitized solar cells has been carried out with titanium(IV), indium(III) and zirconium(IV) oxide precursor solutions. The nanostructured electrodes were characterized using nitrogen gas sorption (NGS), x-ray diffraction (XRD), x-ray photoelectron spectroscopy (XPS), energy dispersive x-ray spectroscopy (EDX), ...

(DOI: 10.1111/J.1151-2916.1997.TB03245.X) During the past five years, the authors have developed in their laboratory a new type of solar cell that is based on a photoelectrochemical process. The light absorption is performed by a monolayer of dye (i.e., a Ruthenium complex) that is adsorbed chemically at the surface of a semiconductor (i.e., titanium oxide (TiO{sub 2})). ...

Barbé, C. J., Arendse, F., Comte, P., Jirousek, M., Lenzmann, F., Shklover, V., & Grätzel, M. (2005). Nanocrystalline Titanium Oxide Electrodes for Photovoltaic ...

Nanocrystalline Titanium Oxide Electrodes for Photovoltaic Applications; Nanocrystalline Titanium Oxide Electrodes for Photovoltaic Applications. CB. Christophe J. Barbé ...

Nanocrystalline titanium oxide electrodes for photovoltaic applications

Where j p p and v p p are maximum power output, and Is the incident light intensity (mW / c m - 2).. Results and Discussion Crystal Structure and Optical Properties. Figure 1 shows the XRD patterns of the TiO 2 powders prepared by the sol-gel method using different H 2 O/Ti molar ratios. The graphs noticeably confirm that the prepared samples encompass an ...

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Self-Assembled TiO2 with Increased Photoelectron Production, and Improved Conduction and Transfer: Enhancing Photovoltaic Performance of Dye-Sensitized Solar ... Dunbar Birnie ACS ...

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Solar cells based on dye-sensitized mesoporous films of TiO2 arelow-cost alternatives to conventional solid-state devices1. Impressive solar-to-electrical energy conversion efficiencies have been ...

Barb C, Arendse F, Comte P, Jirousek M, Lenzmann F, Shklover V, Gratzel M. Nanocrystalline titanium oxide electrodes for photovoltaic applications. J Am Ceram Soc, 1997, 80: 3157-3171. Article Google Scholar Gratzel M. Solar energy conversion by dye-sensitized photovoltaic cells. Inorg Chem, 2005, 44: 6841-6851