



# Solar cell laser sintering

In this work, we introduce a novel Ag metal contact printing technique for SHJ solar cells using a Ag nanoparticle ink and an in-line laser sintering process with the goal of ...

In this paper, we report a novel selective laser sintering of TiO<sub>2</sub> nanoparticle (Degussa P25) film on plastic conductive substrates for highly efficient flexible dye-sensitized solar cell (DSC) applications. The so-called "selective sintering" means that the absorbed laser energy can effectively promote the electrical contacts between the TiO<sub>2</sub> nanoparticles, ...

The authors present their work on laser-enhanced contact optimization (LECO) on iTOPCon solar cells. LECO improves the metal-semiconductor contact resistivity  $r_c$  on the boron emitter and ...

Laser sintering of W micro (1-5 mm) and nano (80-100 nm) particles, supplied by SkySpring Nanomaterials Inc. was carried out on stainless steel (SS) substrate to form a spectral selective layer. Tungsten was chosen as a material of choice because it intrinsically has relatively high absorptance in the solar spectrum and low emittance in ...

In this study, laser sintering of TiO<sub>2</sub> nanoparticle films on plastic substrates was conducted in order to improve the incident photon-to-electron conversion efficiency (IPCE) of flexible dye ...

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By identifying the right combination of laser parameters, in particular the integrated laser fluence  $F$ , we fabricated dye solar cells (DSCs) with UV laser-sintered TiO<sub>2</sub> films exhibiting a power conversion efficiency  $\eta = 5.2\%$ , the highest reported for laser-sintered devices.  $\eta$  is dramatically affected by  $F$  and a clear trend is reported. ...

References [1] Schubert G. Thick Film Metallisation of Crystalline Silicon Solar Cells, Mechanisms, Models and Applications. Dissertation, Universität Konstanz, Fachbereich Physik; 2006. [2] Hong K-K, Cho S-B, Huh J-Y, Park HJ, Jeong J-W. Role of PbO-Based Glass Frit in Ag Thick-Film Contact Formation for Crystalline Si Solar Cells. ...

The laser-sintering method promotes a decrease in recombination losses in the TiO<sub>2</sub> film and an improvement in the charge-collection efficiency, which can result in an increase in the efficiency of such solar cells. Furthermore, the efficient-laser sintering method has a great potential for application in the roll-to-roll technology of the ...



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We have analysed and optimised a laser process for the sintering of the TiO<sub>2</sub> layers in dye solar cells (DSCs). Through a thermographic characterisation of the process, we show that it is possible to scale and process large areas uniformly (16 cm<sup>2</sup>).

Photothermal CO<sub>2</sub> laser sintering of anatase titanium dioxide (TiO<sub>2</sub>) nanoparticles (NPs) is reported in this paper for depositing transparent TiO<sub>2</sub> thin films on quartz substrates. Drops of TiO<sub>2</sub> NPs suspension are spread on the substrates using a spin-coating technique to prepare wet TiO<sub>2</sub> thin films of different thicknesses in a controlled ...

3.2 Sintering process and contact formation process of solar cells 3.2.1 Sintering process of solar cells. Following the printing of the solar cells, the metal paste is sintered. This is the rapid thermal processing in an infrared radiation furnace, the wafers were taken to a rapid thermal annealing (RTA) furnace with a steady flow of air.

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The experimental results demonstrate that the near-infrared laser sintering can enhance the electrical connection between TiO<sub>2</sub> nanoparticles without destroying the flexible ...

Scanning laser processing has become a useful and often used tool in thin film solar cell industries, since it enables precise, low cost, non-contact and highly automated ...

PDF | On Jan 1, 2006, M Alem and others published Laser micro-sintering as a new metallization technique for silicon solar cells | Find, read and cite all the research you need on ResearchGate

Abstract: Scanning laser processing has become a useful and often used tool in thin film solar cell industries, since it enables precise, low cost, non-contact and highly automated fabrication processes such as scribing, patterning, marking, edge deletion, local melting and sintering. Dye solar cells (DSCs) are electrochemical photovoltaic devices representing ...

In this Research Article, we demonstrate pulsed laser processing of a silver nanowire network transparent conductor on top of an otherwise complete solar ...

In this paper, we report a novel selective laser sintering of TiO<sub>2</sub> nanoparticle (Degussa P25) film on plastic conductive substrates for highly efficient flexible dye-sensitized solar cell (DSC) applications. The so-called "selective sintering" means that the absorbed laser energy can effectively promote the electrical contacts between the ...



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Scanning laser processing has become a useful and often used tool in thin film solar cell industries, since it enables precise, low cost, non-contact and highly automated fabrication processes such as scribing, patterning, marking, edge deletion, local melting and sintering. Dye Solar Cells (DSCs) are electrochemical photovoltaic devices ...

The aim of solar cell researchers and manufacturers is to find technologies leading to an increase in the efficiencies of solar cells and, at the same time, keep low costs. ... laser sintering of the contact, an all-laser based process for metallization of solar cells can be thus developed. Fig. 1. Principle of LIFT process for metallization of ...

The front side metallization, usually achieved by screen printing and rapid thermal processing [1], is a key process step in the fabrication of crystalline Si solar cells, and strongly influences the optical and electrical properties of the cells. The solar cell front side is commonly metallized by silver (Ag) front side metallization pastes, which usually ...

Crystalline silicon solar cells based on all-laser-transferred contacts (ALTC) have been fabricated with both front and rear metallization achieved through laser induced forward transferring. Both the front and rear contacts were laser-transferred from a glass slide coated with a metal layer to the silicon substrate already processed with ...

applied sciences Article Laser Sintering of TiO<sub>2</sub> Films for Flexible Dye-Sensitized Solar Cells Huan Yang 1, Wenwen Liu 2, Changwen Xu 1,\*, Dianyuan Fan 1, Yu Cao 2 and Wei Xue 2,\* 1 International ...

113 Properties Selective laser sintering method of manufacturing front electrode of silicon solar cell 1. Introduction Selective Laser Sintering consist on integration of a powder layers using a ...

Solar cells manufactured from laser-textured multicrystalline silicon wafers demonstrate worse electrical performance than cells manufactured from the non-textured wafers after saw damage removal ...

Photovoltaic cells are one way of achieving solar energy. One of the stages of their fabrication is the production of front electrode. The application of an unconventional method of selective laser sintering ...

Chapter 9 gives a review on the potential application of laser surface processing in the fabrication of dye-sensitized solar cells (DSSCs). Conventional techniques used in the ...

In this study, laser sintering of TiO<sub>2</sub> nanoparticle films on plastic substrates was conducted in order to improve the incident photon-to-electron conversion efficiency (IPCE) of flexible dye-sensitized solar cells (DSCs). Lasers with different wavelengths (355 nm and 1064 nm) were used to process the TiO<sub>2</sub> electrodes. With an ...

The application of an unconventional method of selective laser sintering using the  $\text{CO}_2$  laser



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for the fabrication of ...

The selective laser sintering of TiO<sub>2</sub>-film nanoparticles on a plastic conductive substrate is considered for application in flexible dye-sensitized solar cells. It is shown that the absorbed energy of the laser radiation during laser sintering promotes electrical-contact formation between TiO<sub>2</sub> nanoparticles without damaging the plastic ...

We have analysed and optimised a laser process for the sintering of the TiO<sub>2</sub> layers in dye solar cells (DSCs). Through a thermographic characterisation of the ...

Laser Sintering of Screen-printed Silver Paste for Silicon Solar Cells Yafu Lin, Emmanuel Van Kerschaver and Kirsten Cabanas-Holmen Hanwha Solar America LLC, Santa Clara, CA 95051 USA

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