Plasmonics for improved photovoltaic devices

Plasmonics for improved photovoltaic devices. Photovoltaics, the conversion of sunlight to electricity, is a promising technology that may allow the generation of electrical power on a very large scale. Worldwide photovoltaic . production was more than 5 GW in 2008, and is expected to rise above 20 GW by 2015. Photovoltaics could thus make a ...

Plasmonics for improved photovoltaic devices. Nat Mater, 9 (2010), pp. 205-213. Crossref View in Scopus Google Scholar [10] S. Pillai, M.A. Green. Plasmonics for photovoltaic applications. Sol Energy Mater Sol Cells, 94 (2010), pp. 1481-1486. View PDF View article View in Scopus Google Scholar [11]

Now plasmonics researchers are turning their attention to photovoltaics, where design approaches based on plasmonics can be used to improve absorption in photovoltaic devices, permitting a considerable reduction in the physical thickness of solar photovoltaic absorber layers, and yielding new options for solar-cell design.

Plasmonics for photovoltaic applications. Author links open overlay panel S. Pillai, M.A. Green. Show more. Add to Mendeley. Share. ... Metal and dielectric nanoparticle scattering for improved optical absorption in photovoltaic devices. Appl. Phys. Lett. (2008) ... Solar Energy, Volume 163, 2018, pp. 545-551. Firas Obeidat. Show 3 more articles.

Plasmonics is an emerging field that makes use of the nanoscale properties of metals. Though plasmonics is a wide area of study, its application for solar cells has seen a recent surge of interest as is evident from the increasing number of publications over the last couple of ...

Solar energy is the utmost abundantly available, clean, pollution-free, and economically viable energy source on the Earth, and the sun is the ultimate source of this solar energy. ... Atwater, H. A., and Polman, A. (2010). Plasmonics for improved photovoltaic devices. Nat. Mater. 9, 205-213. doi: 10.1038/nmat2629. PubMed Abstract | CrossRef ...

There are several review articles related to the enhancement of photocatalysis using Plasmon resonances e.g., Zheng et al. [26] presented the improvements in water splitting using plasmonics however, the discussion is not expanded towards hydrogen production.Another systematic review by Dodekatos et al. [27] summarized the enhancements in solar energy ...

A plasmonic-enhanced solar cell, commonly referred to simply as plasmonic solar cell, is a type of solar cell (including thin-film or wafer-based cells) that converts light into electricity with the assistance of plasmons, but where the photovoltaic effect occurs in another material. [1] [2] [3]A direct plasmonic solar cell is a solar cell that converts light into electricity using plasmons as ...

Plasmonics for improved photovoltaic devices

Plasmonics for improved photovoltaic devices Harry A. Atwater1* and Albert Polman2* The emerging field of plasmonics has yielded methods for guiding and localizing light at the nanoscale, well ...

Plasmonic photovoltaics are one of the most exciting fields in nanophotonics at the moment [48-51] 1998, Stuart and Hall observed 20-fold enhanced photocurrent at the wavelength of 800 nm when silver nanoparticles were deposited onto silicon [].This was the earliest idea of using plasmonic resonances to manipulate light and improve the absorption in ...

The emerging field of plasmonics has yielded methods for guiding and localizing light at the nanoscale, well below the scale of the wavelength of light in free space. Now plasmonics researchers are turning their attention to photovoltaics, where design approaches based on plasmonics can be used to improve absorption in photovoltaic devices, permitting a ...

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Nature Materials 9, 205-213 (2010); published online 19 February 2010; corrected online 1 September 2010. In Fig. 1a of the version of this Review originally published, the graph labelled "2-mm ...

A correction to a review article published in Nature Materials in 2010, which discusses the use of plasmonics to enhance the performance of solar cells. The error concerned the thickness of a ...

Light trapping is a very essential part of thin-film solar cells to improve their performance and make them comparable to the conventional c-Si solar cells. In this paper, we report the efficiency enhancement of 50% in hydrogenated amorphous silicon (a-Si:H) thin-film solar cells by light trapping from silver nanoparticles incorporated as plasmonic back reflector. ...

In the past few years, the field of plasmonics has emerged as a rapidly expanding new area for materials and device research. 4. This . Plasmonics for improved photovoltaic devices. harry a. atwater. 1 * and albert Polman. 2 * The emerging field of plasmonics has yielded methods for guiding and localizing light at the nanoscale, well below the ...

Several approaches have been adopted in the past for increasing the light absorption in photovoltaic solar cells. The introduction of a plasmonic layer of Ib metal nanoparticles (pure or embedded in a dielectric layer) has been recognized as a viable alternate approach for enhancing light absorption. The scattering from metal nanoparticles near their ...

Plasmonics for improved photovoltaic devices harry a. atwater1* and albert Polman2* The emerging field of plasmonics has yielded methods for guiding and localizing light at the nanoscale, well below the scale of the

wavelength of light in free space. Now plasmonics researchers are turning their attention to photovoltaics, where design

Plasmonics for Improved Photovoltaic Devices Nature Materials - United Kingdom doi 10.1038/nmat2866. Full Text Open PDF Abstract. Available in full text. Categories Mechanics of Materials Materials Science Chemistry Condensed Matter Physics Mechanical Engineering. Date. September 23, 2010. Authors

Investigation of the exciton generation rate profile along the perovskite layer shows that the improved device performance is due to the ... A. Plasmonics for improved photovoltaic devices. Nat. ...

Plasmonics for improved photovoltaic devices. Nat Mater (2010) M.A. Green et al. Harnessing plasmonics for solar cells. Nat Photonics (2012) W. Ye Plasmonic nanostructures in solar energy conversion. J Mater Chem C (2017) D.T. Gangadharana Recent advancements in plasmon-enhanced promising third-generation solar cells.