Magnetron sputtering coating solar collector

Sputter-coated ant specimen (Aulacopone relicta) for SEM examination.. Sputter coating in scanning electron microscopy is a sputter deposition process [clarification needed] to cover a specimen with a thin layer of conducting material, typically a metal, such as a gold/palladium (Au/Pd) alloy. A conductive coating is needed to prevent charging of a ...

Reactive magnetron sputtering is a variation of magnetron sputtering in which a reactive gas (nitrogen, oxygen, acetylene, ...) is introduced into the sputtering process along with the inert gas used for plasma generation ...

The Al-N cermet solar selective coatings with double cermet layer film structure have been deposited onto batches of solar collector tubes using a commercial-scale cylindrical dc magnetron sputter coater. Two Al-N cermet solar absorber layers are deposited by dc reactive sputtering in a gas mixture of argon and nitrogen.

This overview article will deal with a special application of the sputtering process, namely, the "magnetron sputtering technique." In order to understand the underlying physical processes ...

coatings Article HiPIMS and DC Magnetron Sputter-Coated Silver Films for High-Temperature Durable Reflectors Sophie Gledhill *, Kevin Steyer, Charlotte Weiss and Christina Hildebrandt Fraunhofer Institute for Solar Energy Systems, Heidenhofstraße 2, 79110 Freiburg, Germany;

6 · Solar thermal selective coatings (STSCs) are crucial for enhancing the thermal efficiency of receivers in solar power applications. ... including solar power towers, ...

In this study we will present a numerical model that allow us to correlate the selectivity of the produced absorbers to the collector efficiency. The cathodic magnetron ...

The group developed a multilayer of Mo/Pt-Al 2 O 3 (HMVF)/Pt-Al 2 O 3 (LMVF)/Al 2 O 3 on a stainless steel substrate using a magnetron sputtering technique. This SSAC ...

6 · Solar thermal selective coatings (STSCs) are crucial for enhancing the thermal efficiency of receivers in solar power applications. ... including solar power towers, parabolic dishes, parabolic trough ...

Thermal solar collector efficiency can be defined as the rate between the collector energy transferred to the fluid (water or oil) and solar incident energy over the collector: i= mc p ... For the absorber coatings magnetron sputtering is a widely used PVD deposition process. In the last few years, magnetron sputtered chromium oxide ...

High entropy composite SSAs with antireflection layers have been prepared by non-equilibrium reactive RF

magnetron sputtering. ... or fluid-based direct absorption solar collectors to convert it into heat energy [1]. Nowadays, the most acceptable absorbers in industry are solar selective coatings grown by physical vapor ...

Colored solar selective coatings with metal (Ti, W) - dielectric multilayer (AlN, AlON) structures were designed and developed, using magnetron sputtering method [6, 9, 30]. The coatings can show different colors, controlled by ...

Barshilia and coworkers reported the obtaining of Ag-Al 2 O 3 nanocermet solar selective coating, deposited on copper, silicon and glass substrates, using ...

Metallic platinum-titanium coatings were deposited by co-sputtering of two metallic Pt and Ti targets in pure argon atmosphere. The titanium concentrations varied from 0 to 47 atomic percent and were adjusted as a function of the current applied to the titanium target. The structural and chemical features of these films were assessed by X-ray ...

A team of researchers prepared VO 2-TiN composite coating, using magnetron sputtering, Hao et al. (2018). The composite was deposited onto previously prepared TiN nanoparticle films that were prepared from TiO x nanoparticles film. The last was formed by magnetron sputtering onto the substrate masked with Al 2 O 3.

Thermal performance enhancement of solar collectors by surface geometric modifications on ... Keywords: Heat transfer enhancement, nano-fluids, solar selective coating, solar collector, thermal performance. I. ... 2002 Copper and aluminium V-Al2O3 0.98 0.02 Magnetron sputtering Khamlich et al. [17] 2013 Tantalum Cr/a-Cr2O3 0.90 0.28 ...

Construction and operation of a cylindrical magnetron sputtering system for coating glass tubes with solar selective surfaces is described. A metal carbide on copper selective surface produced in ...

the same for solar-collector materials. A solar collector is a device which absorbs solar radiation, converts it to thermal energy, and delivers the ther-mal energy to a heat-transfer medium. Energy efficiency, i.e., minimized losses associated with the energy transfer, can be achieved by using suitable materials in the components of the solar ...

direct current (DC) magnetron sputter coater was used to deposit Al-N cermet solar coatings onto batches of solar collector tubes. Only one cylindrical aluminium target was employed in a sputter coater [5]. An Al metal infrared reflector layer was deposited in pure argon gas. The

The thickness of thin films deposited by magnetron sputtering is 107.2 nm, 104.4 nm, and 101.9 nm for ZnO, TiO2, and SiO2 thin films. Download: Download high-res image (221KB) ... While the temperature of the water leaving the traditional solar collector (no coating) was 21 °C. The difference between the inlet and outlet ...

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Most solar collectors use a spectrally selective absorber surface which has high absorptance at solar spectrum range and low emittance at infrared spectrum range to ...

The application of SSACs for solar collectors started in 1950s. Tabor applied black nickel, black chrome and NiS ZnS composites to flat-plate solar collectors by electro deposition [14].The coatings prepared by wet chemical methods were extensively studied and reported [[15], [16], [17]].However, the thermal and chemical stability of ...

The Al/NbMoN/NbMoON/SiO 2 solar selective absorbing coatings developed for its potential applications in concentrated solar power (CSP) system were ...

DOI: 10.1016/S0042-207X(01)00372-4 Corpus ID: 93781258; Chromium-based thin sputtered composite coatings for solar thermal collectors @article{Teixeira2002ChromiumbasedTS, title={Chromium-based thin sputtered composite coatings for solar thermal collectors}, author={Vasco Teixeira and ...

A medium-temperature selective coating obtained by co-sputtering titanium and aluminum targets was studied. o A novel CPC evacuated tube solar collector using the selective coating was developed. The instantaneous efficiency based the gross solar collector area is significantly higher than that of ordinary collectors. o

In this work, we report an experimental study for the preparation of optical coatings based on TiO 2 /SiO 2 and Al 2 O 3 /SiO 2 multilayer dielectric films realized by reactive magnetron sputtering by depositing alternating layers of two materials. During the experimental realization, some important requirements must be fulfilled.

Parabolic trough solar collector systems are the most advanced concentrating solar power technology for large-scale power generation purposes. The current work reviews various selective coating materials and their characteristics for different designs in concentrating solar power. Solar selective absorbing coatings ...

NiCrAlO/Al 2 O 3 solar selective coating prepared by direct current (DC) magnetron sputtering and water boiling is demonstrated in this paper. Firstly, the coating consisting of tandem layers of Au/NiCrAl/Al with different NiCr volume fractions in NiCrAl sublayers is deposited solely by DC magnetron sputtering. Then the coating is boiled ...

Solar selective absorbing coatings collect solar radiation and convert it to heat. To promote higher efficiency and lower energy costs at higher temperatures ...

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