

Title (en)

PHOTOACTIVE MATERIAL COMPRISING NANOPARTICLES OF AT LEAST TWO PHOTOACTIVE CONSTITUENTS

Title (de)

PHOTOAKTIVES MATERIAL MIT NANOPARTIKELN AUS MINDESTENS ZWEI PHOTOAKTIVEN BESTANDTEILEN

Title (fr)

MATÉRIAU PHOTOACTIF COMPRENANT DES NANOPARTICULES D'AU MOINS DEUX COMPOSANTS PHOTOACTIFS

Publication

EP 2614177 A4 20140910 (EN)

Application

EP 11822958 A 20110909

Priority

- US 201161474495 P 20110412
- US 38165610 P 20100910
- CA 2011001022 W 20110909

Abstract (en)

[origin: WO2012031357A1] A photoactive material including nanoparticles of photoactive first and second constituents. The first and second constituents have respective conduction band energies, valence band energies and electronic band gap energies to enable photon-driven generation and separation of charge carriers in each of the first and second constituents by absorption of light in the solar spectrum. The first and second constituents are provided in an alternating layered arrangement of respective first and second layers or are mixed together in a single layer. The nanoparticles have diameters smaller than wavelengths of light in the solar spectrum, to provide optical transparency for absorption of light. The charge carriers, upon photoactivation, are able to participate in redox reactions occurring in the photoactive material. The photoactive material may enable redox reactions of carbon dioxide with at least one of hydrogen and water to produce a fuel.

IPC 8 full level

C25B 3/25 (2021.01); **C07C 1/12** (2006.01); **C10G 2/00** (2006.01)

CPC (source: EP)

C10G 2/50 (2013.01); **C25B 1/55** (2021.01)

Citation (search report)

- [XYI] US 2010108488 A1 20100506 - CHEN LE [US], et al
- [XYI] US 2007137998 A1 20070621 - SYKORA MILAN [US], et al
- [Y] US 2007020157 A1 20070125 - HYDE RODERICK A [US]
- [AP] VERENA PFEIFER ET AL: "Energy Band Alignment between Anatase and Rutile TiO 2", THE JOURNAL OF PHYSICAL CHEMISTRY LETTERS, vol. 4, no. 23, 5 December 2013 (2013-12-05), pages 4182 - 4187, XP055132405, ISSN: 1948-7185, DOI: 10.1021/jz402165b
- [Y] HONGYAN LIU ET AL: "Preparation and Properties of Nanocrystalline alpha-Fe2O3-Sensitized TiO2 Nanosheets as a Visible Light Photocatalyst", JOURNAL OF THE AMERICAN CERAMIC SOCIETY, vol. 89, no. 1, 1 January 2006 (2006-01-01), pages 370 - 373, XP055132341, ISSN: 0002-7820, DOI: 10.1111/j.1551-2916.2005.00686.x
- [Y] LEONARDO D. BONIFACIO ET AL: "Stacking the Nanochemistry Deck: Structural and Compositional Diversity in One-Dimensional Photonic Crystals", ADVANCED MATERIALS, vol. 21, no. 16, 27 April 2009 (2009-04-27), pages 1641 - 1646, XP055132047, ISSN: 0935-9648, DOI: 10.1002/adma.200802348
- [IA] CHRISTOPHE J. BARBÉ ET AL: "Nanocrystalline Titanium Oxide Electrodes for Photovoltaic Applications", JOURNAL OF THE AMERICAN CERAMIC SOCIETY, vol. 80, no. 12, 1 December 1997 (1997-12-01), pages 3157 - 3171, XP055132246, ISSN: 0002-7820, DOI: 10.1111/j.1151-2916.1997.tb03245.x
- See references of WO 2012031357A1

Cited by

CN108772095A; US11177766B2

Designated contracting state (EPC)

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

DOCDB simple family (publication)

WO 2012031357 A1 20120315; CA 2812031 A1 20120315; EP 2614177 A1 20130717; EP 2614177 A4 20140910

DOCDB simple family (application)

CA 2011001022 W 20110909; CA 2812031 A 20110909; EP 11822958 A 20110909