

특허증

CERTIFICATE OF PATENT



특허

Patent Number

제 10-1564711 호

출원번호

Application Number

제 10-2014-0031252 호

출원일

Filing Date

2014년 03월 17일

등록일

Registration Date

2015년 10월 26일

발명의 명칭 Title of the Invention

입자를 이용한 열 차단 시스템

특허권자 Patentee

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발명자 Inventor

조승래(720601-5*****)

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위의 발명은 「특허법」에 따라 특허등록원부에 등록되었음을 증명합니다.

This is to certify that, in accordance with the Patent Act, a patent for the invention has been registered at the Korean Intellectual Property Office.



2015년 10월 26일

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COMMISSIONER,

KOREAN INTELLECTUAL PROPERTY OFFICE

최 동 규

특허증

CERTIFICATE OF PATENT



특허

Patent Number

제 10-1595941 호

출원번호

Application Number

제 10-2015-0148017 호

출원일

Filing Date

2015년 10월 23일

등록일

Registration Date

2016년 02월 15일

발명의 명칭 Title of the Invention

입자를 이용한 열 차단 시스템

특허권자 Patentee

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2016년 02월 15일



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특허증

CERTIFICATE OF PATENT



특허

Patent Number

제 10-1596453 호

출원번호

Application Number

제 10-2014-0052953 호

출원일

Filing Date

2014년 04월 30일

등록일

Registration Date

2016년 02월 16일

발명의 명칭 Title of the Invention

공동들을 이용한 열 차단 시스템용 다중층 코팅 시스템 및 그 제조방법

특허권자 Patentee

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발명자 Inventor

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2016년 02월 16일



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특허증

CERTIFICATE OF PATENT



특허

Patent Number

제 10-1598989 호

출원번호

Application Number

제 10-2015-0148016 호

출원일

Filing Date

2015년 10월 23일

등록일

Registration Date

2016년 02월 24일

발명의 명칭 Title of the Invention

입자를 이용한 열 차단 시스템

특허권자 Patentee

주식회사 머트리얼스비전(120111-0*****)

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대한민국 서울시 송파구 오금로 17길 13 701호

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2016년 02월 24일



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URKUNDE

Europäisches Patent

Es wird hiermit bescheinigt,
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der Patentschrift bezeichneten
Vertragsstaaten erteilt worden ist.

CERTIFICATE

European patent

It is hereby certified that a
European patent has been granted
in respect of the invention
described in the patent specifica-
tion for the Contracting States
designated in the specification.

CERTIFICAT

Brevet européen

Il est certifié qu'un brevet
européen a été délivré pour
l'invention décrite dans le
fascicule de brevet, pour les
Etats contractants désignés
dans le fascicule de brevet.

Europäisches Patent Nr.
European patent No.
Brevet européen n°

3068206

Patentinhaber
Proprietor(s) of the patent
Titulaire(s) du brevet

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António Campinos

Präsident des Europäischen Patentamts
President of the European Patent Office
Président de l'Office européen des brevets

München, den 01.07.20
Munich, le
Munich, le



URKUNDE

Europäisches Patent

Es wird hiermit bescheinigt,
dass für die in der Patentschrift
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Europäisches Patent Nr.
European patent No.
Brevet européen n°

3067197

Patentinhaber
Proprietor(s) of the patent
Titulaire(s) du brevet

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António Campinos

Präsident des Europäischen Patentamts
President of the European Patent Office
Président de l'Office européen des brevets

München, den
Munich,
Munich, le

01.07.20

The
United
States
of
America



**The Director of the United States
Patent and Trademark Office**

Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America, and if the invention is a process, of the right to exclude others from using, offering for sale or selling throughout the United States of America, or importing into the United States of America, products made by that process, for the term set forth in 35 U.S.C. 154(a)(2) or (c)(1), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b). See the Maintenance Fee Notice on the inside of the cover.

Joseph Matal

Performing the Functions and Duties of the

Under Secretary of Commerce for Intellectual Property and

Director of the United States Patent and Trademark Office



US009835929B2

(12) **United States Patent**
Cho

(10) **Patent No.:** **US 9,835,929 B2**
(45) **Date of Patent:** **Dec. 5, 2017**

(54) **MULTI-LAYER COATING SYSTEM USING VOIDS FOR HEAT BLOCKING SYSTEM AND METHOD FOR MANUFACTURING SAME**

(71) **Applicant:** **MATERIALS VISION CO., LTD.,**
Incheon (KR)

(72) **Inventor:** **Sung Nae Cho, Seoul (KR)**

(73) **Assignee:** **MATERIALS VISION CO., LTD.,**
Incheon (KR)

(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 23 days.

(21) **Appl. No.:** **15/033,842**

(22) **PCT Filed:** **Nov. 3, 2014**

(86) **PCT No.:** **PCT/KR2014/010438**

§ 371 (c)(1),

(2) **Date:** **May 2, 2016**

(87) **PCT Pub. No.:** **WO2015/065134**

PCT Pub. Date: May 7, 2015

(65) **Prior Publication Data**

US 2016/0299404 A1 Oct. 13, 2016

Related U.S. Application Data

(63) Continuation of application No. 14/146,426, filed on Jan. 2, 2014, now Pat. No. 9,372,291.

(Continued)

(30) **Foreign Application Priority Data**

Apr. 30, 2014 (KR) 10-2014-0052953

(51) **Int. Cl.**

G02F 1/23 (2006.01)

B05D 7/00 (2006.01)

(Continued)

(52) **U.S. Cl.**

CPC **G02F 1/23** (2013.01); **B05D 7/222**
(2013.01); **B05D 7/50** (2013.01); **B05D 7/544**
(2013.01);

(Continued)

(58) **Field of Classification Search**

CPC . **B05D 7/04**; **B05D 7/222**; **B05D 7/50**; **B05D 7/544**; **B05D 7/546**; **G02F 1/0018**;
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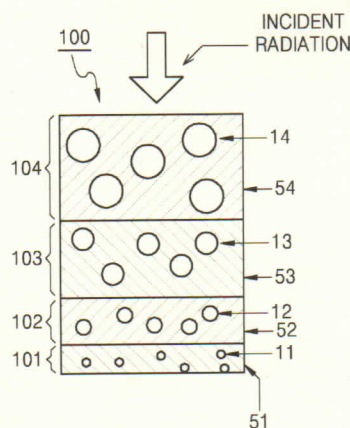
Primary Examiner — Loha Ben

(74) *Attorney, Agent, or Firm* — KORUS Patent, LLC;
Seong Il Jeong

(57) **ABSTRACT**

Provided are a multilayered-coating system and a method of manufacturing the same. The multi-layered coating system includes: a layer 1 including a plurality of spherical voids with a radius a_1 that are randomly distributed and separated from one another and a filler material with a refractive index n_1 that is disposed in a space between the spherical voids; and subsequent layers expressed as the following word-equation, "a layer i located above a layer $i-1$ and including a plurality of spherical voids with a radius a_i that are

(Continued)



The
United
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America



**The Director of the United States
Patent and Trademark Office**

Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America, and if the invention is a process, of the right to exclude others from using, offering for sale or selling throughout the United States of America, or importing into the United States of America, products made by that process, for the term set forth in 35 U.S.C. 154(a)(2) or (c)(1), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b). See the Maintenance Fee Notice on the inside of the cover.

Michelle K. Lee

Director of the United States Patent and Trademark Office



US009372291B2

(12) **United States Patent**
Cho

(10) **Patent No.:** **US 9,372,291 B2**

(45) **Date of Patent:** **Jun. 21, 2016**

(54) **HEAT BLOCKING SYSTEM UTILIZING PARTICULATES**

(71) Applicant: **Sung Nae Cho, Kent, WA (US)**

(72) Inventor: **Sung Nae Cho, Kent, WA (US)**

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 65 days.

(21) Appl. No.: **14/146,426**

(22) Filed: **Jan. 2, 2014**

(65) **Prior Publication Data**

US 2014/0118815 A1 May 1, 2014

Related U.S. Application Data

(60) Provisional application No. 61/899,832, filed on Nov. 4, 2013, provisional application No. 61/908,608, filed on Nov. 25, 2013.

(51) **Int. Cl.**
G02F 1/23 (2006.01)
G02B 5/20 (2006.01)
G02B 5/26 (2006.01)
G02F 1/01 (2006.01)

(52) **U.S. Cl.**
CPC **G02B 5/208** (2013.01); **G02B 5/206** (2013.01); **G02B 5/26** (2013.01); **G02F 1/0102** (2013.01); **G02F 2201/083** (2013.01); **G02F 2201/30** (2013.01); **Y10T 428/24967** (2015.01); **Y10T 428/249921** (2015.04); **Y10T 428/249971** (2015.04); **Y10T 428/249975** (2015.04); **Y10T 428/25** (2015.01)

(58) **Field of Classification Search**
CPC B82Y 20/00; H04B 10/505; H04B 10/506; H04B 10/50575

USPC 359/278, 290–298, 350, 358–359, 361; 428/212, 328–329, 429; 165/279–280; 219/200, 202–203, 209–210, 219–220; 252/582–584, 587–589

See application file for complete search history.

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Primary Examiner — Bumsuk Won

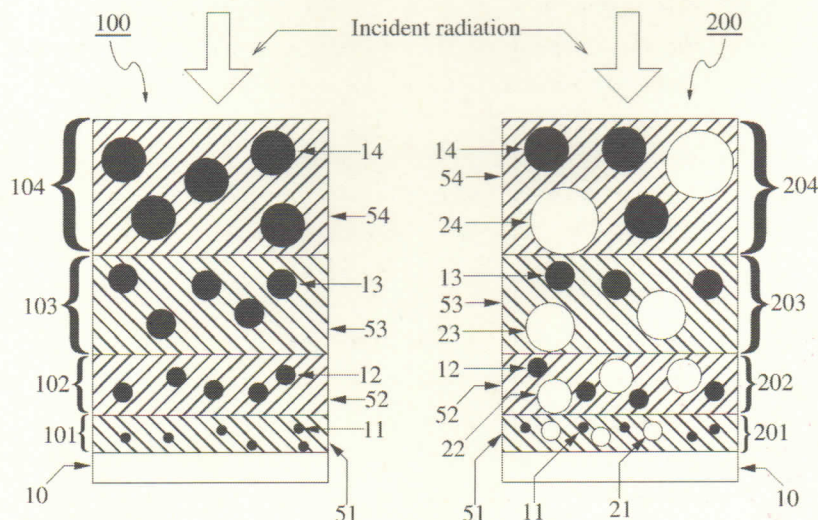
Assistant Examiner — Tamara Y Washington

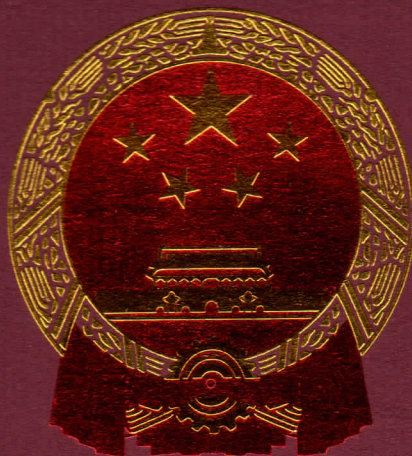
(74) *Attorney, Agent, or Firm* — KORUS Patent, LLC; Seong Il Jeong

(57) **ABSTRACT**

A multi-layered coating system for reflecting infrared waves is provided. The multi-layered coating system includes a layer one positioned above a substrate, wherein the layer one includes a plurality of well separated spherical particulates of radius a_1 and a plurality of well separated spherical voids of radius $b_1 > a_1$ that are randomly distributed, and a filler material of refractive index n_1 intervening in the spaces between said spherical particulates and spherical voids; and subsequent layers expressible as the following word-equation, “a layer i positioned above the layer $i-1$, wherein the layer i includes a plurality of well separated spherical particulates of radius a_i and a plurality of well separated spherical voids of radius $b_i > a_i$ (where $b_i > b_{i-1}$) that are randomly distributed, and a filler material of refractive index n_i intervening in the spaces between said spherical particulates and spherical voids,” where integer i is greater than one.

20 Claims, 11 Drawing Sheets





发明专利证书

Certificate of Invention Patent

中华人民共和国国家知识产权局

STATE INTELLECTUAL PROPERTY OFFICE OF THE PEOPLE'S REPUBLIC OF CHINA

证书号第 3073152 号



发明专利证书

发明名称: 多层涂覆系统

发明人: 赵胜来

专利号: ZL 2014 8 0060388.2

专利申请日: 2014 年 11 月 03 日

专利权人: 材料视觉有限公司

地址: 韩国仁川广域市

授权公告日: 2018 年 09 月 14 日

授权公告号: CN 105874896 B

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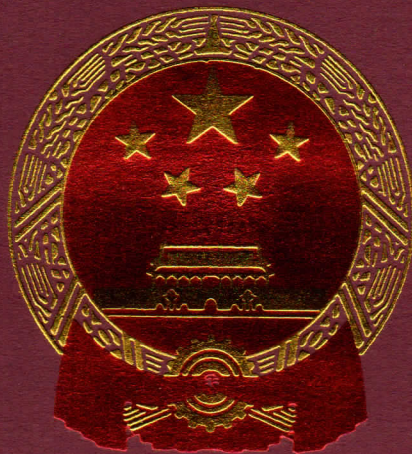
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发明专利证书

Certificate of Invention Patent

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证书号第2663832号



发明专利证书

发明名称：用于热阻隔系统的多层涂覆系统及其制造方法

发明人：赵胜来

专利号：ZL 2014 8 0060391.4

专利申请日：2014年11月03日

专利权人：材料视觉有限公司

授权公告日：2017年10月20日

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