US009408383B2

(12) **United States Patent**
Petit et al.

(10) **Patent No.: US 9,408,383 B2**
(45) **Date of Patent: Aug. 9, 2016**

(54) **ROOFING GRANULES**

(71) Applicants: **Pierre-Olivier Petit**, Enghien-les-bains (FR); **Keith C. Hong**, Lititz, PA (US); **Gregory F. Jacobs**, Oreland, PA (US); **Kamila Plevacova**, Courbevoie (FR)

(72) Inventors: **Pierre-Olivier Petit**, Enghien-les-bains (FR); **Keith C. Hong**, Lititz, PA (US); **Gregory F. Jacobs**, Oreland, PA (US); **Kamila Plevacova**, Courbevoie (FR)

(73) Assignee: **CERTAINTEED CORPORATION**, Malvern, PA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 123 days.

(21) Appl. No.: **13/834,722**

(22) Filed: **Mar. 15, 2013**

(65) **Prior Publication Data**

US 2014/0004168 A1 Jan. 2, 2014

Related U.S. Application Data

(60) Provisional application No. 61/665,410, filed on Jun. 28, 2012.

(51) **Int. Cl.**

A01N 25/26	(2006.01)
A01N 55/00	(2006.01)
A01N 25/12	(2006.01)
A01N 59/20	(2006.01)

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

CPC ***A01N 25/26*** (2013.01); ***A01N 25/12*** (2013.01); ***A01N 55/00*** (2013.01); ***A01N 59/20*** (2013.01)

(58) **Field of Classification Search**

CPC A01N 25/25; A01N 25/12; A01N 59/20; A01N 55/00; E04D 13/002

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,046,295	A	6/1936	Nichols	
2,197,895	A	4/1940	Nichols	
3,528,842	A	9/1970	Skadulis	
5,356,664	A	10/1994	Narayan et al.	
5,382,475	A	1/1995	Kayser	
5,411,803	A	5/1995	George et al.	
6,143,318	A	11/2000	Gilchrist et al.	
6,214,466	B1	4/2001	Joedicke	
6,245,381	B1	6/2001	Israel	
6,569,520	B1	5/2003	Jacobs	
6,585,813	B2	7/2003	Kiik et al.	
6,593,260	B2	7/2003	Nomura	
6,815,379	B2	11/2004	Nomura	
6,838,152	B2	1/2005	Joedicke	
6,838,171	B2	1/2005	Nomura	
6,939,820	B2 *	9/2005	Numaguchi	C03C 3/16 424/604
7,060,658	B2	6/2006	Joedicke	
7,323,237	B2	1/2008	Koschitzky	
7,354,596	B1	4/2008	Banovetz et al.	
7,595,107	B2	9/2009	Kalkanoglu et al.	
7,687,106	B2	3/2010	Hong et al.	
7,704,903	B2	4/2010	Seneschal et al.	
7,811,630	B2	10/2010	Hong et al.	
8,039,048	B2	10/2011	Hong et al.	
2001/0023156	A1	9/2001	Nomura	
2002/0098110	A1	7/2002	Graham et al.	
2003/0150170	A1	8/2003	Weber	
2004/0002416	A1	1/2004	Nomura	
2004/0002417	A1	1/2004	Nomura	
2004/0139886	A1	7/2004	Joedicke	
2004/0255548	A1	12/2004	Hong et al.	
2004/0258835	A1	12/2004	Hong et al.	
2005/0031703	A1	2/2005	Beier et al.	
2005/0069592	A1	3/2005	Fechner et al.	
2005/0233888	A1	10/2005	Seneschal et al.	
2006/0142413	A1 *	6/2006	Zimmer et al.	523/122
2006/0166806	A1	7/2006	Fechner et al.	
2006/0172877	A1	8/2006	Fechner et al.	
2006/0251807	A1	11/2006	Hong et al.	
2007/0148340	A1	6/2007	Kalkanoglu et al.	
2007/0148342	A1	6/2007	Kalkanoglu et al.	
2008/0008858	A1	1/2008	Hong et al.	
2008/0026183	A1	1/2008	Vanpoulle et al.	
2008/0118640	A1	5/2008	Kalkanoglu et al.	
2008/0241516	A1	10/2008	Hong et al.	
2008/0248246	A1	10/2008	Shiao et al.	
2008/0261007	A1	10/2008	Hong et al.	
2008/0277056	A1 *	11/2008	Kalkanoglu et al.	156/280
2010/0098777	A1	4/2010	Gould et al.	
2010/0240526	A1	9/2010	Hong et al.	
2011/0159237	A1	6/2011	Bryson et al.	
2011/0159240	A1	6/2011	Shiao et al.	
2012/0157583	A1	6/2012	Shiao et al.	

FOREIGN PATENT DOCUMENTS

CA	2041964	A1	11/1991
DE	4130365	A1	3/1993
DE	19943303	A1	3/2001
DE	10300813	A1	7/2004
DE	10308186	A1	9/2004
EP	0458713	A1	11/1991
EP	1116698	A1	7/2001
EP	1580172	A2	9/2005

(Continued)

Primary Examiner — Frederick Krass

Assistant Examiner — Tracy Liu

(74) *Attorney, Agent, or Firm* — Abel Law Group, LLP; Alexander H. Plache

(57) **ABSTRACT**

A biocidal glass composition for use in roofing applications can include glass doped with at least one biocidal agent that includes about 0.01 wt. % to about 50 wt. % of a total weight % of the biocidal glass composition. The biocidal glass composition can be included in a coating on a base particle of a roofing granule. Further included is a process of forming the roofing granule.

15 Claims, 5 Drawing Sheets