



US012077662B2

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

(10) **Patent No.: US 12,077,662 B2**  
(45) **Date of Patent: Sep. 3, 2024**

(54) **LOW DENSITY COLORED COMPOSITION AND METHODS OF MAKING**

(71) Applicants: **H.B. Fuller Construction Products, Inc.**, St. Paul, MN (US); **H.B. Fuller Company**, St. Paul, MN (US)

(72) Inventors: **Gregory W. Schad**, Cary, IL (US); **David Eckert**, Palatine, IL (US); **Kevin P. Del Bene**, Downers Grove, MN (US); **Brian W. Carlson**, Woodbury, IL (US); **Bronwyn T. Miller**, Belvidere, IL (US)

(73) Assignees: **H.B. Fuller Construction Products, Inc.**, St. Paul, MN (US); **H.B. Fuller Company**, St. Paul, MN (US)

(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 100 days.

(21) Appl. No.: **17/649,131**

(22) Filed: **Jan. 27, 2022**

(65) **Prior Publication Data**

US 2022/0235214 A1 Jul. 28, 2022

**Related U.S. Application Data**

(60) Provisional application No. 63/142,076, filed on Jan. 27, 2021, provisional application No. 63/142,089, filed on Jan. 27, 2021.

(51) **Int. Cl.**  
**C09K 3/10** (2006.01)  
**C08K 7/22** (2006.01)  
**C08L 33/04** (2006.01)  
**C09D 5/02** (2006.01)  
**C09D 7/62** (2018.01)  
**C09D 133/04** (2006.01)

(52) **U.S. Cl.**  
CPC ..... **C08L 33/04** (2013.01); **C08K 7/22** (2013.01); **C09D 5/022** (2013.01); **C09D 5/028** (2013.01); **C09D 7/62** (2018.01); **C09D 133/04** (2013.01); **C09K 3/10** (2013.01); **C08L 2201/52** (2013.01); **C08L 2205/025** (2013.01); **C08L 2205/03** (2013.01); **C08L 2205/14** (2013.01); **C09K 2200/0625** (2013.01)

(58) **Field of Classification Search**  
CPC ..... **C08K 7/22**  
USPC ..... **523/218**  
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,615,972 A \* 10/1971 Morehouse, Jr. .... C08J 9/32  
523/210  
5,607,993 A 3/1997 Christy  
8,409,683 B2 \* 4/2013 Kosaka ..... C09J 7/38  
428/317.1  
8,802,750 B2 8/2014 Abrami et al.  
9,725,636 B2 8/2017 Amos et al.  
2002/0062764 A1 5/2002 Audibert et al.  
2005/0065240 A1 \* 3/2005 Kyte ..... C08J 9/32  
523/218  
2005/0197444 A1 9/2005 Kyte et al.  
2016/0257620 A1 9/2016 Peters et al.  
2017/0190864 A1 7/2017 Kocurek et al.

FOREIGN PATENT DOCUMENTS

CA 2467235 11/2005  
CN 101302360 5/2011  
CN 202089896 12/2011  
CN 104018143 9/2014  
CN 103305716 2/2015  
CN 105623638 6/2016  
CN 103725276 8/2016  
CN 106280655 1/2017  
CN 106433225 2/2017  
CN 109401280 A \* 3/2019  
CN 106512874 4/2019  
CN 108299861 11/2020  
EP 0324242 10/1991  
EP 2070671 6/2009  
JP 2001064481 3/2001  
JP 2006274765 10/2006  
KR 1662721 10/2016  
RU 2652040 C1 4/2018  
WO WO01/14273 3/2001

OTHER PUBLICATIONS

Bang Laboratories, Inc., "Working with Microspheres". Article—TechNote 201-2013, pp. 1-16. Indiana, USA.  
Cospheric LLC, "Coated Glass and Silica Precision Microspheres" Product Information, Sep. 2018, pp. 1-4.  
Cospheric LLC, "Coatings used on Microspheres for Various Applications" Article. Sep. 2018, pp. 1-7.  
Prizmalite Industries Inc., "Glass Microspheres" 2013, pp. 1-2.  
Bang Laboratories, Inc., "Absorption to Microspheres". Article—TechNote 204-2013, pp. 1-5. Indiana, USA.  
3M, "Glass Bubbles K Series, S Series and iM Series", Product Information, 2013, pp. 1-4, USA.

(Continued)

Primary Examiner — Vickey Nerangis  
(74) Attorney, Agent, or Firm — Daniel J. Barta; Kirsten Stone

(57) **ABSTRACT**

A colored composition including a resin system, and a colorized filler. The colorized filler includes particles including a polymer. The particles have a density less than 2.6 g/cc and an average particle size from 100 microns to 600 microns.

**13 Claims, 15 Drawing Sheets**