



US008206485B2

(12) **United States Patent**
Larink, Jr.

(10) **Patent No.:** **US 8,206,485 B2**
(45) **Date of Patent:** **Jun. 26, 2012**

(54) **METAL POWDERS AND METHODS FOR PRODUCING THE SAME**

(75) Inventor: **Steven C. Larink, Jr.**, Tucson, AZ (US)

(73) Assignee: **Climax Engineered Material, LLC**, Phoenix, AZ (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 141 days.

(21) Appl. No.: **12/169,916**

(22) Filed: **Jul. 9, 2008**

(65) **Prior Publication Data**

US 2008/0271567 A1 Nov. 6, 2008

Related U.S. Application Data

(62) Division of application No. 11/092,023, filed on Mar. 29, 2005, now Pat. No. 7,470,307.

(51) **Int. Cl.**
C22C 27/04 (2006.01)

(52) **U.S. Cl.** **75/255; 420/429**

(58) **Field of Classification Search** **75/255**
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,898,978 A	8/1959	Kitchen et al.
3,071,463 A	1/1963	Hausner et al.
3,592,395 A	7/1971	Lockwood et al.
3,617,358 A	11/1971	Dittrich
3,865,586 A	2/1975	Volin et al.
3,909,241 A *	9/1975	Cheney et al. 75/255
3,974,245 A	8/1976	Cheney et al.
4,028,095 A	6/1977	Laferty, Jr. et al.

4,146,388 A	3/1979	Lafferty et al.
4,221,614 A	9/1980	Yoda et al.
4,376,055 A	3/1983	Korosec et al.
4,502,885 A	3/1985	Cheney
4,592,781 A	6/1986	Cheney et al.
4,613,371 A	9/1986	Cheney et al.
4,622,068 A	11/1986	Rowe et al.
4,670,047 A	6/1987	Kopatz et al.
4,687,510 A	8/1987	Cheney et al.
4,708,159 A	11/1987	Lockwood, Jr.
4,714,468 A	12/1987	Wang et al.
4,767,313 A	8/1988	Lockwood, Jr.
4,770,948 A	9/1988	Oikawa et al.
4,778,516 A	10/1988	Raman
4,802,915 A	2/1989	Kopatz et al.
4,819,873 A	4/1989	Lockwood, Jr.
4,838,784 A	6/1989	Lockwood, Jr.

(Continued)

FOREIGN PATENT DOCUMENTS

EP 1348669 1/2003

(Continued)

OTHER PUBLICATIONS

"Successful Tests: Materials Successfully Dried in PCS Dryers as of Jun. 2001, 161 Materials", Web page, Downloaded Mar. 28, 2005, <http://www.pulsedry.com/materials.html> (3 pages).

(Continued)

Primary Examiner — George Wyszomierski
(74) *Attorney, Agent, or Firm* — Fennemore Craig, P.C.

(57) **ABSTRACT**

A method for producing a metal powder product involves: Providing a supply of a precursor metal powder; combining the precursor metal powder with a liquid to form a slurry; feeding the slurry into a pulsating stream of hot gas; and recovering the metal powder product.

6 Claims, 7 Drawing Sheets

PULSE SPRAY DRY RECIPES A-D

