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(54) **SYSTEM AND METHOD FOR PRODUCING COPPER POWER BY ELECTROWINNING IN A FLOW-THROUGH ELECTROWINNING CELL**

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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

7,368,049 B2 *	5/2008	Sandoval et al.	205/576
7,378,010 B2 *	5/2008	Stevens et al.	205/574
7,378,011 B2 *	5/2008	Sandoval et al.	205/576
7,452,455 B2 *	11/2008	Sandoval et al.	205/579
7,494,580 B2 *	2/2009	Sandoval et al.	205/576
2006/0021880 A1 *	2/2006	Sandoval et al.	205/576
2008/0105556 A1 *	5/2008	Sandoval et al.	205/148

* cited by examiner

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(57) **ABSTRACT**

This invention relates to a system and method for producing a metal powder product using conventional electrowinning chemistry (i.e., oxygen evolution at an anode) in a flow-through electrowinning cell. The present invention enables the production of high quality metal powders, including copper powder, from metal-containing solutions using conventional electrowinning processes and/or direct electrowinning.

18 Claims, 2 Drawing Sheets