

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
24 November 2005 (24.11.2005)

PCT

(10) International Publication Number
WO 2005/110657 A2

(51) International Patent Classification⁷: **B23K 3/06**

(21) International Application Number:
PCT/US2005/013153

(22) International Filing Date: 18 April 2005 (18.04.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/562,964 16 April 2004 (16.04.2004) US
60/609,589 14 September 2004 (14.09.2004) US

(71) Applicant (for all designated States except US): **P. KAY METAL, INC.** [US/US]; 2448 East 25th Street, Los Angeles, CA 90058 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **KAY, Lawrence, C.** [US/US]; 10560 Wilshire Boulevard, No. 506, Los Angeles, CA 90024 (US). **SEVERIN, Erik, J.** [US/US]; 920 East Colorado Boulevard, No. 306, Pasadena, CA 91106 (US). **AGUIRRE, Luis, A.** [US/US]; 14082 Domart Avenue, Norwalk, CA 90650 (US).

(74) Agent: **SEIBEL, Richard, D.**; Christie Parker & Hale, LLP, Post Office Box 7068, Pasadena, CA 91109-7068 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— without international search report and to be republished upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **SOLDERING PROCESS**

(57) **Abstract:** A process by which molten solder is purified in-situ, making the soldering process more efficient and yielding better results, particularly for lead-free soldering. Leadfree solder becomes practical for use since the temperature for reliable soldering is reduced. A layer of active additive is maintained on the surface of molten solder for scavenging metal oxide from the solder and assimilating metal oxide into a liquid layer. The active additive is an organic liquid having nucleophilic and/or electrophilic groups. As an example, a layer of dimer acid maintained on a wave soldering apparatus scavenges metal oxide from the bath, and assimilates dross that may form on the surface. Scavenging metal oxide cleanses the bath and lowers viscosity of the solder, and PC boards or the like soldered on the wave have reliable solder joints.



WO 2005/110657 A2