

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
13 November 2003 (13.11.2003)

PCT

(10) International Publication Number
WO 03/092911 A1

(51) International Patent Classification⁷: **B05D 1/18.**
C25D 3/30, 3/32

(21) International Application Number: PCT/US03/10541

(22) International Filing Date: 8 April 2003 (08.04.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/136,858 30 April 2002 (30.04.2002) US

(71) Applicant (*for all designated States except US*): **TECH-
NIC, INC.** [US/US]; 111 East Ames Court, Plainview, NY
11803 (US).

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

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

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): **SCHETTY, Robert, A., III** [US/US]; 23 Paddock Drive, Ft. Salogna, NY 11768 (US). **VICKERS, Winnie, Ruth** [US/US]; 42 Driving Park, Lynbrook, NY 11563 (US).

(74) Agents: **FANUCCI, Allan, A.** et al.; Winston & Strawn, Patent Department, 1400 L Street, N.W., Washington, DC 20005 (US).

Declaration under Rule 4.17:

— *of inventorship (Rule 4.17(iv)) for US only*

Published:

— *with international search 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: MINIMIZING WHISKER GROWTH IN TIN ELECTRODEPOSITS

(57) Abstract: The present invention relates to a method for reducing tin whisker formation in tin deposits by plating on an underlying metal tin deposits which are essentially free of compressive stress or are predominantly in a predetermined crystal orientation that essentially matches that of the underlying metal in order to inhibit tin whisker growth. The deposits preferably exhibit no compressive stress or exhibit a tensile stress. Also, the most preferred crystal orientation is one that is the same as that of the underlying metal. The deposit preferably contains at least 95 % tin and optionally at least one alloying element of silver, bismuth, copper or zinc in an amount of 5 % or less. Advantageously, the tin deposits are provided during electroplating from a specially formulated plating solution that contains a crystal orientation surfactant.



WO 03/092911 A1