

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
23 January 2003 (23.01.2003)

PCT

(10) International Publication Number
WO 03/007312 A3

(51) International Patent Classification⁷: **C22C 05/02**,
32/00

(21) International Application Number: PCT/US02/15870

(22) International Filing Date: 20 May 2002 (20.05.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/293,457 24 May 2001 (24.05.2001) US
60/306,218 18 July 2001 (18.07.2001) US
10/151,741 20 May 2002 (20.05.2002) 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, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, 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, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(71) Applicant: **FRY'S METALS, INC.** [US/US]; 250 Culver Avenue, Jersey City, NJ 07304 (US).

Published:
— with international search report

(72) Inventors: **SREERAM, Attiganal, N.**; 14 Michelle Court, Princeton, NJ 08450 (US). **LEWIS, Brian**; 11 Helen Road, Branford, CT 06405 (US). **HOZER, Leszek**; 2603 Quail Ridge Drive, Plainsboro, NJ 08536 (US). **LIBERATORE, Michael, James**; 208B Bakers Basin Road, Trenton, NJ 08648 (US). **MINOGUE, Gerard**; 2 Kiel Avenue, Kinnelon, NJ 07405 (US).

(88) Date of publication of the international search report:
14 August 2003

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.

(74) Agents: **RITCHEY, Steven, M.** et al.; Senniger, Powers, Leavitt & Roedel, 1 Metropolitan Square, 16th Floor, St Louis, MO 63102 (US).

(54) Title: THERMAL INTERFACE MATERIAL AND HEAT SINK CONFIGURATION

(57) Abstract: A thermal interface material for use in electronic packaging, the thermal interface material comprises a solder with relatively high heat flow characteristics and a CTE modifying component to reduce or prevent damage due to thermal cycling. The thermal interface material comprises an active solder that contains indium and an intrinsic oxygen getter selected from the group consisting of alkali metals, alkaline-earth metals, refractory metals, rare earth metals and zinc and mixtures and alloys thereof. Lastly, damage due to an electronic package due to thermal cycling stress is reduced by using an insert in a lid of an electronic device package wherein the insert has a coefficient of thermal expansion that is between about that of the lid and about that of a semiconductor substrate.



WO 03/007312 A3