

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
08 December 2022 (08.12.2022)



(10) International Publication Number
WO 2022/256629 A1

(51) International Patent Classification:

H01L 23/427 (2006.01) H01L 23/373 (2006.01)
H05K 1/02 (2006.01)

(21) International Application Number:

PCT/US2022/032126

(22) International Filing Date:

03 June 2022 (03.06.2022)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

63/197,080 04 June 2021 (04.06.2021) US

(71) Applicant: KUPRION, INC. [US/US]; 4425 Fortran Dr.,
San Jose, California 95134 (US).

(72) Inventor: ZINN, Alfred A.; 1073 Maddux Drive, Palo Alto,
California 94303 (US).

(74) Agent: KAISER, Iona N. et al.; 909 Fannin Street, Suite
2700, Houston, Texas 77010 (US).

(81) Designated States (unless otherwise indicated, for every

kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every

kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

(54) Title: HEAT PIPES FEATURING COEFFICIENT OF THERMAL EXPANSION MATCHING AND HEAT DISSIPATION USING SAME

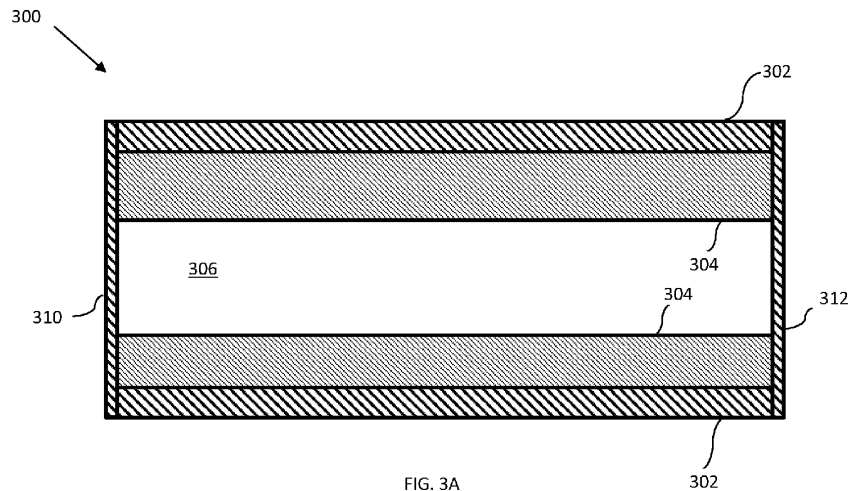


FIG. 3A

(57) Abstract: Heat pipes may be tailored for coefficient of thermal expansion (CTE) matching with heat-producing components, such as electronic components, in thermal contact therewith. Copper nanoparticles may be consolidated under mild conditions with a CTE modifier to form a copper composite defining a sealed outer shell of a heat pipe, which may contact a heat-producing component for promoting effective heat transfer and robust bonding between the two. A working fluid for promoting heat transfer may be present within an internal space defined within the sealed outer shell. The working fluid may transfer heat from a first location to a second location within the heat pipe. The heat may enter the heat pipe from a heat source contacting the first location, and the heat may exit the heat pipe at the second location through discharge to a suitable heat sink.

[Continued on next page]

Published:

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*