

Title (en)

METHOD FOR BONDING METALLIC CONTACT AREAS WITH DISSOLUTION OF A SACRIFICIAL LAYER APPLIED ON ONE OF THE CONTACT AREAS IN AT LEAST ONE OF THE CONTACT AREAS

Title (de)

VERFAHREN ZUM BONDEN VON METALLISCHEN KONTAKTFLÄCHEN UNTER LÖSEN EINER AUF EINER DER KONTAKTFLÄCHEN AUFGEBRACHTEN OPFERSCHICHT IN MINDESTENS EINER DER KONTAKTFLÄCHEN

Title (fr)

PROCÉDÉ PERMETTANT D'ASSEMBLER DES SURFACES DE CONTACT MÉTALLIQUES PAR DÉTACHEMENT D'UNE COUCHE SACRIFICIELLE APPLIQUÉE SUR UNE DES SURFACES DE CONTACT DANS AU MOINS UNE DES SURFACES DE CONTACT

Publication

EP 2994935 A1 20160316 (DE)

Application

EP 13734099 A 20130705

Priority

EP 2013064239 W 20130705

Abstract (en)

[origin: WO2015000527A1] The present invention relates to a method for bonding a first at least partly metallic contact area of a first substrate (1, 1') with a second at least partly metallic contact area of a second substrate with the following steps, more particularly the following sequence: - applying to at least one of the contact areas a sacrificial layer (4) which is soluble at least partly, more particularly predominantly, in the material of at least one of the contact areas, - bonding the contact areas with at least partial dissolution of the sacrificial layer (4) in at least one of the contact areas. The contact areas can be arranged over the whole area on a bonding region (3). Alternatively, the contact areas can be formed from a plurality of bonding regions (3') which are surrounded by bulk material (5) or arranged in substrate cavities (2). A liquid (e.g. water) can be used to produce a pre-bond between the substrates.

IPC 8 full level

H01L 21/60 (2006.01); **H01L 21/66** (2006.01); **H01L 21/67** (2006.01); **H01L 23/488** (2006.01)

CPC (source: EP KR US)

H01L 22/12 (2013.01 - KR); **H01L 24/03** (2013.01 - EP KR US); **H01L 24/05** (2013.01 - EP KR US); **H01L 24/06** (2013.01 - EP KR US); **H01L 24/27** (2013.01 - EP KR US); **H01L 24/29** (2013.01 - EP KR US); **H01L 24/32** (2013.01 - EP KR US); **H01L 24/743** (2013.01 - EP KR US); **H01L 24/83** (2013.01 - EP KR US); **H01L 22/12** (2013.01 - EP US); **H01L 2223/54426** (2013.01 - EP KR US); **H01L 2224/0345** (2013.01 - EP KR US); **H01L 2224/03452** (2013.01 - EP US); **H01L 2224/03602** (2013.01 - EP US); **H01L 2224/03616** (2013.01 - EP US); **H01L 2224/0381** (2013.01 - EP US); **H01L 2224/05561** (2013.01 - EP US); **H01L 2224/05564** (2013.01 - EP US); **H01L 2224/05567** (2013.01 - EP US); **H01L 2224/05647** (2013.01 - EP US); **H01L 2224/061** (2013.01 - EP US); **H01L 2224/274** (2013.01 - EP US); **H01L 2224/2741** (2013.01 - EP US); **H01L 2224/27444** (2013.01 - EP US); **H01L 2224/2745** (2013.01 - EP US); **H01L 2224/27452** (2013.01 - EP US); **H01L 2224/27464** (2013.01 - EP US); **H01L 2224/2781** (2013.01 - EP US); **H01L 2224/2784** (2013.01 - EP US); **H01L 2224/27845** (2013.01 - EP US); **H01L 2224/29023** (2013.01 - EP US); **H01L 2224/29028** (2013.01 - EP US); **H01L 2224/29187** (2013.01 - EP US); **H01L 2224/8301** (2013.01 - EP US); **H01L 2224/83011** (2013.01 - EP US); **H01L 2224/83012** (2013.01 - EP US); **H01L 2224/83013** (2013.01 - EP US); **H01L 2224/83026** (2013.01 - EP US); **H01L 2224/8312** (2013.01 - US); **H01L 2224/83121** (2013.01 - EP US); **H01L 2224/83203** (2013.01 - EP US); **H01L 2224/8383** (2013.01 - EP US); **H01L 2224/83907** (2013.01 - EP US); **H01L 2924/00014** (2013.01 - EP US); **H01L 2924/01029** (2013.01 - US)

C-Set (source: EP US)

1. **H01L 2224/8301 + H01L 2924/00012**
2. **H01L 2224/0345 + H01L 2924/00014**
3. **H01L 2224/03452 + H01L 2924/00014**
4. **H01L 2224/03616 + H01L 2924/00014**
5. **H01L 2224/03602 + H01L 2924/00014**
6. **H01L 2224/27464 + H01L 2924/00014**
7. **H01L 2224/2745 + H01L 2924/00014**
8. **H01L 2224/27452 + H01L 2924/00014**
9. **H01L 2224/2741 + H01L 2924/00012**
10. **H01L 2224/27444 + H01L 2924/00012**
11. **H01L 2224/274 + H01L 2924/00012**
12. **H01L 2224/2784 + H01L 2924/00014**
13. **H01L 2224/27845 + H01L 2924/00014**
14. **H01L 2224/29187 + H01L 2924/05442**
15. **H01L 2924/00014 + H01L 2224/05552**

Citation (examination)

- US 2009023299 A1 20090122 - YOKONAGA NORIYUKI [JP]
- US 2009023243 A1 20090122 - KOYANAGI MITSUMASA [JP]
- DE 102009050426 B3 20110331 - FRAUNHOFER GES FORSCHUNG [DE]
- WO 2012136266 A1 20121011 - EV GROUP E THALLNER GMBH [AT], et al
- DE 102004015017 A1 20051020 - FRAUNHOFER GES FORSCHUNG [DE]
- BAUER J ET AL: "Surface tension, adhesion and wetting of materials for photolithographic process", JOURNAL OF VACUUM SCIENCE & TECHNOLOGY B: MICROELECTRONICSPROCESSING AND PHENOMENA, vol. 14, no. 4, July 1996 (1996-07-01), US, pages 2485 - 2492, XP055274723, ISSN: 0734-211X, DOI: 10.1116/1.588757
- HABY J: "What is dry air?", 12 May 2013 (2013-05-12), XP055275079, Retrieved from the Internet <URL:https://web.archive.org/web/20130512010453/http://www.theweatherprediction.com/habyhints2/455> [retrieved on 20160524]
- HOWLADER M M R ET AL: "Room-Temperature Microfluidics Packaging Using Sequential Plasma Activation Process", IEEE TRANSACTIONS ON ADVANCED PACKAGING, IEEE SERVICE CENTER, PISCATAWAY, NJ, USA, vol. 29, no. 3, 3 August 2006 (2006-08-03), pages 448 - 456, XP002756617, ISSN: 1521-3323, [retrieved on 20060807], DOI: 10.1109/TADVP.2006.875070
- AHMED W (HRSG.): "Nanomaterials and Nanotechnology", 2016, ONE CENTRAL PRESS, article SARIKOV A: "Thermodynamic study of the phase separation mechanisms in nonstoichiometric Si oxide films during high temperature annealing", pages: 36 - 57, XP055362419
- LIDE D R ET AL: "CRC Handbook of Chemistry and Physics: a Ready-Reference Book of Chemical and Physical Data", 1990, CRC PRESS, BOCA RATON, USA, ISBN: 0-8493-0471-7, article "Physical Constants of Inorganic Compounds", XP002642995

- GHANDHI S K: "VLSI Fabrication Principles. Silicon and Gallium Arsenide", 1983, JOHN WILEY & SONS, New York, US, ISBN: 978-0-471-86833-0, article "chapter 1.4 "Crystal Defects", subchapter 1.4.1 "Point Defects", subsubchapter 1.4.1.1 "Thermal Fluctuation Effects"", pages: 14 - 20, XP055362577
- See also references of WO 2015000527A1

Designated contracting state (EPC)

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

Designated extension state (EPC)

BA ME

DOCDB simple family (publication)

WO 2015000527 A1 20150108; CN 105340070 A 20160217; CN 105340070 B 20190816; CN 110310896 A 20191008; CN 110310896 B 20230815; EP 2994935 A1 20160316; EP 3301706 A1 20180404; JP 2016524335 A 20160812; JP 6282342 B2 20180221; KR 102124233 B1 20200618; KR 102158960 B1 20200923; KR 20160030164 A 20160316; KR 20200071150 A 20200618; SG 11201600043R A 20160226; TW 201513234 A 20150401; TW 201921519 A 20190601; TW 202034409 A 20200916; TW 202236441 A 20220916; TW I645476 B 20181221; TW I735814 B 20210811; TW I775080 B 20220821; TW I826971 B 20231221; US 2016071817 A1 20160310; US 9640510 B2 20170502

DOCDB simple family (application)

EP 2013064239 W 20130705; CN 201380077980 A 20130705; CN 201910644305 A 20130705; EP 13734099 A 20130705; EP 17172555 A 20130705; JP 2016522292 A 20130705; KR 20167000125 A 20130705; KR 20207016609 A 20130705; SG 11201600043R A 20130705; TW 103120384 A 20140612; TW 107139009 A 20140612; TW 109116876 A 20140612; TW 111110400 A 20140612; US 201314787397 A 20130705