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23 April 2009

(54) Title: NON-RANDOM ARRAY ANISOTROPIC CONDUCTIVE FILM (ACF) AND MANUFACTURING PROCESSES

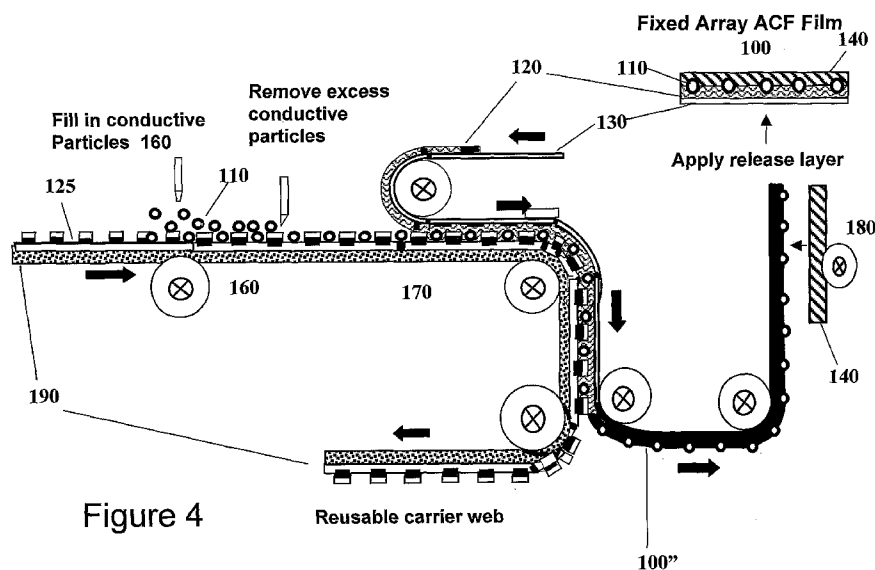


Figure 4

(57) Abstract: The present invention discloses structures and manufacturing processes of an ACF of improved resolution and reliability of electrical connection using a non-random array of microcavities of predetermined configuration, shape and dimension. The manufacturing process includes the steps of (i) fluidic filling of conductive particles onto a substrate or carrier web comprising a predetermined array of microcavities, or (ii) selective metallization of the array followed by filling the array with a filler material and a second selective metallization on the filled microcavity array. The thus prepared filled conductive microcavity array is then over-coated or laminated with an adhesive film. release layer

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**INTERNATIONAL SEARCH REPORT**

International application No.

PCT/US06/42229

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC: **B32B 3/00( 2006.01)**

USPC: 428/173  
 According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
 U.S. : 428/173; 355/403; 349/86,92,156,189

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,120,948 A1 (JOHNSON et al) 19 September 2000 (19.09.2000), column 8, lines 53-55; column 4, lines 22-28; column 11, lines 38-44; column 5, lines 26-31; column 1, lines 41-43. US 5,672,400 (HANSEN et al) 30 September 1997 (30.09.1997), column 1, lines 29-39 and lines 47-52.	1-8, 10-17, 20
Y	US 6,120,948 A1 (JOHNSON et al) 19 September 2000 (19.09.2000), column 8, lines 53-55; column 4, lines 22-28; column 11, lines 38-44; column 5, lines 26-31; column 1, lines 41-43. US 5,672,400 (HANSEN et al) 30 September 1997 (30.09.1997), column 1, lines 29-39 and lines 47-52. US 5,533,447 (JOHNSON et al) 09 July 1996 (09.07.1996), column 2, lines 8-12.	9, 18-19

Further documents are listed in the continuation of Box C.  See patent family annex.

* Special categories of cited documents:		
"A" document defining the general state of the art which is not considered to be of particular relevance	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means		
"P" document published prior to the international filing date but later than the priority date claimed	"&"	document member of the same patent family

Date of the actual completion of the international search 06 June 2008 (06.06.2008)	Date of mailing of the international search report <b>17 JUN 2008</b>
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201	Authorized officer <i>[Signature]</i> Telephone No.

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US06/42229

## Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
  
3.  Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:  
Please See Continuation Sheet

1.  As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
  2.  As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of any additional fees.
  3.  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
  
  4.  No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
- Remark on Protest**
- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
  - The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
  - No protest accompanied the payment of additional search fees.

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US06/42229

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,120,948 A1 (JOHNSON et al) 19 September 2000 (19.09.2000), column 8, lines 53-55; column 4, lines 22-28; column 11, lines 38-44; column 5, lines 26-31; column 1, lines 41-43. US 5,672,400 (HANSEN et al) 30 September 1997 (30.09.1997), column 1, lines 29-39 and lines 47-52. US 6,834,612 B2 (CHAMBERS et al) 28 December 2004 (28.12.2004), column 1, lines 59-61; column 2, lines 24-40; column 4, lines 23-46; column 5, lines 58-67; column 17, lines 9-11.	21-28, 31-38
Y	US 6,120,948 A1 (JOHNSON et al) 19 September 2000 (19.09.2000), column 8, lines 53-55; column 4, lines 22-28; column 11, lines 38-44; column 5, lines 26-31; column 1, lines 41-43. US 6,834,612 B2 (CHAMBERS et al) 28 December 2004 (28.12.2004), column 1, lines 59-61; column 2, lines 24-40; column 4, lines 23-46; column 5, lines 58-67; column 17, lines 9-11.	29-30
Y	US 6,120,948 A1 (JOHNSON et al) 19 September 2000 (19.09.2000), column 8, lines 53-55; column 4, lines 22-28; column 11, lines 38-44; column 5, lines 26-31; column 1, lines 41-43. US 5,672,400 (HANSEN et al) 30 September 1997 (30.09.1997), column 1, lines 29-39 and lines 47-52. US 6,834,612 B2 (CHAMBERS et al) 28 December 2004 (28.12.2004), column 1, lines 59-61; column 2, lines 24-40; column 4, lines 23-46; column 5, line JP 07173667 A (HONDA MOTOR CO. LTD.) 11 July 1995 (11.07.1995), Abs.	40

**BOX III. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING**

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

Group I, claim(s) 1-10, drawn to a method for fabricating an electric device.

Group II, claim(s) 11-28, drawn to an anisotropic conductive film (ACF).

The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: a plurality of conductive particles corresponding to a plurality of predefined micro-cavity locations of an array of microcavities for disposing said conductive particles in predefined locations in an adhesive layer is known in Johnson et al. (US 6,120,948) and Hansen et al. (US 5,672,400) (e.g. Johnson Figures 3 and 4; Hansen column 1, lines 29-39). Since the claimed invention is known in the art, unity of invention is not present between Groups I and II.