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(71) Applicant: **National Sun Yat-Sen University**  
**Gushan District, Kaohsiung City 804 (TW)**

(72) Inventors:  
• **Shiea, Jentaie**  
**Kaohsiung City (TW)**  
• **Yuan, Cheng-Hui**  
**Taipei City (TW)**

(74) Representative: **Collin, Jérôme et al**  
**Cabinet Régimbeau**  
**20, rue de Chazelles**  
**75847 Paris Cedex 17 (FR)**

(54) **Mass spectrometer assembly and method for ambient liquid mass spectrometry**

(57) A mass spectrometer including an electrospray-assisted laser desorption ionization device, which includes: an electrospray unit including a nozzle; a voltage supplying member disposed to establish between the nozzle and a receiving unit a potential difference such that liquid drops of the electrospray medium formed at the nozzle are laden with charges, and such that the liquid drops are forced to leave the nozzle toward the receiving unit along a traveling path; a laser desorption unit adapt-

ed to irradiate a sample such that analytes contained in the sample are desorbed to fly along a flying path which intersects the traveling path so as to enable the analytes to be occluded in the liquid drops, and such that as a result of dwindling in size of the liquid drops when moving along the traveling path, charges of the liquid drops will pass on to the analytes occluded therein to form ionized analytes.

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## EUROPEAN SEARCH REPORT

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| DOCUMENTS CONSIDERED TO BE RELEVANT   |  |   |   |
|---|--|---|---|
| Category  | Citation of document with indication, where appropriate, of relevant passages  | Relevant to claim                                   | CLASSIFICATION OF THE APPLICATION (IPC)     |
| X,P   | TW 271 771 B (UNIV NAT SUN YAT SEN [TW])<br>21 January 2007 (2007-01-21)<br>* abstract; figures 3-6 *  | 1,5   | INV.<br>H01J49/04<br>H01J49/16<br>H01J49/14 |
| X,P   | US 2007/176113 A1 (SHIEA JENTAIE [TW] ET AL)<br>2 August 2007 (2007-08-02)<br>* paragraph [0057]; claim 1; figures 2-5 *   | 1,5   |   |
| X   | US 2005/056776 A1 (WILLOUGHBY ROSS C [US] ET AL)<br>17 March 2005 (2005-03-17)<br>* paragraph [0022] *<br>* paragraphs [0049], [0053] *<br>* paragraphs [0063] - [0065]; figures 8-9 *<br>* paragraphs [0069], [0073]; figure 11 * | 1-10  |   |
| X   | US 2005/199823 A1 (FRANZEN JOCHEN [DE])<br>15 September 2005 (2005-09-15)<br>* paragraph [0003] *<br>* paragraphs [0026], [0030], [0031]; figures 1,2 *  | 1,3-5,<br>7-10<br>2,6                               |   |
| Y   | US 6 849 847 B1 (BAI JIAN [US] ET AL)<br>1 February 2005 (2005-02-01)<br>* abstract; figure 1 *<br>* column 7, lines 49-61 *   | 2,6   |   |
| The present search report has been drawn up for all claims  |  |   | TECHNICAL FIELDS SEARCHED (IPC)<br>H01J     |
| Place of search<br>The Hague  |  | Date of completion of the search<br>9 February 2010 | Examiner<br>Loiseleur, Pierre               |
| <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone<br/>Y : particularly relevant if combined with another document of the same category<br/>A : technological background<br/>O : non-written disclosure<br/>P : intermediate document</p> <p>T : theory or principle underlying the invention<br/>E : earlier patent document, but published on, or after the filing date<br/>D : document cited in the application<br/>L : document cited for other reasons<br/>.....<br/>&amp; : member of the same patent family, corresponding document</p> |  |   |   |

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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09-02-2010

| Patent document<br>cited in search report |    | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|---|----|---------------------|----------------------------|---------------------|
| TW 271771                                 | B  | 21-01-2007          | US 2007176113 A1           | 02-08-2007          |
| US 2007176113                             | A1 | 02-08-2007          | TW 271771 B                | 21-01-2007          |
| US 2005056776                             | A1 | 17-03-2005          | NONE                       |                     |
| US 2005199823                             | A1 | 15-09-2005          | DE 102004002729 A1         | 11-08-2005          |
|   |    |                     | GB 2410370 A               | 27-07-2005          |
| US 6849847                                | B1 | 01-02-2005          | EP 0964427 A2              | 15-12-1999          |
|   |    |                     | US 2004217273 A1           | 04-11-2004          |
|   |    |                     | US 2004217274 A1           | 04-11-2004          |
|   |    |                     | US 2004217281 A1           | 04-11-2004          |
|   |    |                     | US 2004217282 A1           | 04-11-2004          |
|   |    |                     | US 2004217283 A1           | 04-11-2004          |