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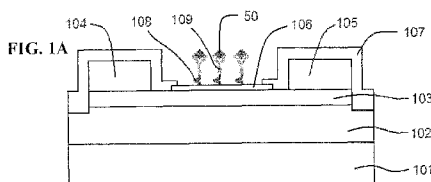
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(54) Title: MATERIALS AND METHODS FOR DETECTING TOXINS, PATHOGENS AND OTHER BIOLOGICAL MATERIALS





(57) Abstract: Embodiments of the present invention provide binding molecule-functionalized high electron mobility transistors (HEMTs) that can be used to detect toxins, pathogens and other biological materials. In a specific embodiment, an antibody-functionalized HEMT can be used to detect botulinum toxin. The antibody can be anchored to a gold-layered gate area of the HEMT through immobilized thioglycolic acid. Embodiments of the subject detectors can be used in field-deployable electronic biological applications based on AlGaIn/GaN HEMTs.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER				
<i>G01N 33/53(2006.01)i, G01N 33/569(2006.01)i, C12Q 1/00(2006.01)i</i>				
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) IPC as above				
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Korean Utility models and applications for Utility models. Japanese Utility models and application for Utility models.				
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) eKOMPASS (KIPO internal), Google, NCBI PubMed (sensor, gate region, high electron mobility transistor, thioglycol*, gold, toxin, etc.)				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X	B. S. KANG, et al., "Electrical detection of biomaterials using AlGaIn/GaN high electron mobility transistors." In Journal of Applied Physics. Vol.104:031101-1-11 (Published online 1 August 2008). See the whole document, especially abstract; page 031101-1, right column, lines 17-19; figures 4, 5, 6 (page 031101-6); page 031101-9, left column, lines 4-10.	1-11		
X	H. T. WANG, et al., "Electrical detection of kidney injury molecule-1 with AlGaIn/GaN high electron mobility transistors." In Applied Physics Letters. Vol.91:222101-1-3 (Published online 26 November 2007). See the whole document, especially abstract; figures 1, and 3; page 222101-3, left column, lines 16-20.	1-11		
X	B. S. KANG, et al., "Prostate specific antigen detection using AlGaIn/GaN high electron mobility transistors." In Applied Physics Letters. Vol.91:112106-1-3 (Published online 11 September 2007). See the whole document, especially abstract; figure 1; page 112106-2, right column, last paragraph; page 112106-3, left column, first paragraph.	1-11		
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.				
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"> * Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified) "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 </td> <td style="width: 50%; border: none;"> "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 "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 "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 "&" document member of the same patent family </td> </tr> </table>			* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified) "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	"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 "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 "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 "&" document member of the same patent family
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Name and mailing address of the ISA/KR  Korean Intellectual Property Office Government Complex-Daejeon, 139 Seonsa-ro, Seo-gu, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140		Authorized officer <p style="text-align: center;">AHN, Kyu Jeong</p> Telephone No. 82-42-481-8158 		

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2009/063502

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	K. H. CHEN, et al., "c-erbB-2 sensing using AlGaIn/GaN high electron mobility transistors for breast cancer detection." In Applied Physics Letters. Vol.92:192103-1-3 (Published online 12 May 2008). See the whole document, especially abstract; figure 1; page 192103-3, left column, lines 14-22.	1-11
A	US 7,403,113 B2 (J.-S. MOON, et al.) 22 July 2008. See the whole document, especially abstract, claims.	1-11

INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 07403113 B2	22.07.2008	US 2005-263790 A1	01.12.2005