

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2019/047389

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> H01L 29/786(2006.01)i; H01L 21/336(2006.01)i FI: H01L29/78 618E; H01L29/78 618B; H01L29/78 618A According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) H01L29/786; H01L21/336  Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Published examined utility model applications of Japan 1922-1996 Published unexamined utility model applications of Japan 1971-2020 Registered utility model specifications of Japan 1996-2020 Published registered utility model applications of Japan 1994-2020  Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2018/061969 A1 (SHARP CORP.) 05.04.2018 (2018-04-05) paragraphs [0041]-[0118], fig. 1, 4	1-8
X Y	JP 2018-190949 A (SEMICONDUCTOR ENERGY LABORATORY CO., LTD.) 29.11.2018 (2018-11-29) paragraphs [0053]-[0324], fig. 5, 18	1-3, 6-8 4, 5
Y	JP 2016-74580 A (SEMICONDUCTOR ENERGY LABORATORY CO., LTD.) 12.05.2016 (2016-05-12) paragraph [0595]	4, 5
A	WO 2009/157535 A1 (IDEMITSU KOSAN CO., LTD.) 30.12.2009 (2009-12-30)	1-8
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> 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 “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 another 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		
Date of the actual completion of the international search 07 February 2020 (07.02.2020)		Date of mailing of the international search report 18 February 2020 (18.02.2020)
Name and mailing address of the ISA/ Japan Patent Office 3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan		Authorized officer  Telephone No.

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

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Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
WO 2018/061969 A1	05 Apr. 2018	US 2019/0326443 A1 paragraphs [0050]- [0126], fig. 1, 4C CN 109791949 A	
JP 2018-190949 A	29 Nov. 2018	US 2018/0076231 A1 paragraphs [0109]- [0380], fig. 5A-1- B-3, 18 WO 2018/047067 A1 TW 201826509 A CN 109643735 A KR 10-2019-0045930 A	
JP 2016-74580 A	12 May 2016	US 2015/0243738 A1 paragraph [0671] CN 104867981 A KR 10-2015-0099467 A TW 201544458 A	
WO 2009/157535 A1	30 Dec. 2009	US 2011/0180392 A1 CN 102131953 A KR 10-2011-0027805 A TW 201012958 A	