

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/EP2019/083702

**A. CLASSIFICATION OF SUBJECT MATTER****H01L 33/62**(2010.01)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)

H01L

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)

EPO-Internal, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 2732478 A1 (KONINKL PHILIPS NV [NL]) 21 May 2014 (2014-05-21) paragraphs [0013], [0035] - [0038]; figures 6-8	1,3-6,9,11,14-17
A	US 2013160978 A1 (SHIN SANG HYUN [KR] ET AL) 27 June 2013 (2013-06-27) paragraph [0040]; figures 2,4g	1,17
A	US 2013099276 A1 (FUKUSHIMA MIZUE [JP] ET AL) 25 April 2013 (2013-04-25) paragraphs [0116] - [0118]; figures 13a-13d	1,17

 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

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"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

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"&amp;" document member of the same patent family

Date of the actual completion of the international search

16 March 2020

Date of mailing of the international search report

23 March 2020

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

International application No.

**PCT/EP2019/083702**

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
EP	2732478	A1	21 May 2014	CN	103650171	A	19 March 2014
				EP	2732478	A1	21 May 2014
				JP	6062429	B2	18 January 2017
				JP	2014518460	A	28 July 2014
				JP	2017073562	A	13 April 2017
				JP	2019197924	A	14 November 2019
				KR	20140048268	A	23 April 2014
				US	2014141552	A1	22 May 2014
				US	2016247969	A1	25 August 2016
				WO	2013011415	A1	24 January 2013
US	2013160978	A1	27 June 2013	JP	2013131748	A	04 July 2013
				KR	20130071812	A	01 July 2013
				US	2013160978	A1	27 June 2013
US	2013099276	A1	25 April 2013	CN	203260631	U	30 October 2013
				JP	WO2012002580	A1	02 September 2013
				US	2013099276	A1	25 April 2013
				WO	2012002580	A1	05 January 2012