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(71) Applicant: **THE GOVERNING COUNCIL OF THE UNIVERSITY OF TORONTO** [CA/CA]; 100 College Street, Toronto, Ontario M5G 1L5 (CA).

(72) Inventors: **NING, Zhijun**; Room 902, Unit 2, Building 19, 678 Huatuo Road, Pudong, Shanghai (CN). **GONG, Xiwen**; 473 Bathurst Street, Toronto, Ontario M5T 2S9 (CA). **COMIN, Riccardo**; Via Tavagnacco, 10, 33100 Udine (IT). **VOZNYI, Oleksandr**; 1512-15 North Park Road, Thornhill, Ontario L4J 0A1 (CA). **SARGENT, Edward**; 10 King's College Road, GB 447, Toronto, Ontario M6S 3G8 (CA).

(74) Agent: **HILL & SCHUMACHER**; 264 Avenue Road, Toronto, Ontario M4V 2G7 (CA).

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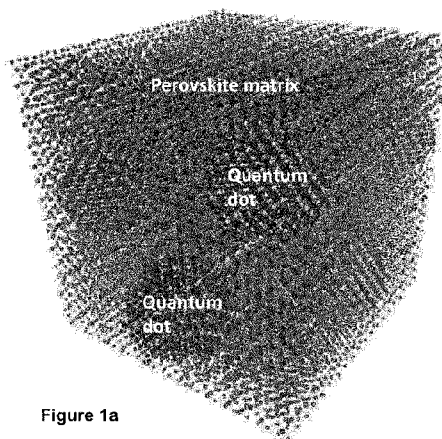


Figure 1a

(57) Abstract: The present disclosure provides a composite material of a pre-formed crystalline or polycrystalline semiconductor particles embedded in a crystalline or polycrystalline perovskite matrix material. The pre-formed crystalline or polycrystalline semiconductor particles and crystalline or polycrystalline perovskite being selected so that any lattice mismatch between the two lattices does not exceed about 10%. The pre-formed crystalline or polycrystalline semiconductor particles and said crystalline or polycrystalline perovskite matrix material have lattice planes that are substantially aligned.



INTERNATIONAL SEARCH REPORT

International application No.

PCT/CA2016/050244

A. CLASSIFICATION OF SUBJECT MATTER

IPC: **H01L 29/04** (2006.01), **C04B 35/78** (2006.01), **C30B 29/68** (2006.01), **C30B 33/06** (2006.01),
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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: H01L 29/04 (2006.01), C04B 35/78 (2006.01), C30B 29/68 (2006.01), C30B 33/06 (2006.01), H01L 31/0368 (2006.01), H01L 33/16 (2010.01)

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

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

Databases: Google Patent; Questel/Orbit; Canadian Patent Database

Search terms: composite material; pre-formed crystalline; polycrystalline particles; matrix; lattice mismatch; lattice planes; semiconductor; semiconductor particles; perovskite; precursors; align; mixing; liquid; quantum dots; ratio; size; nanoparticles; university of Toronto; Ning; Gong; Comin; Voznyy; Sargent

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2014/0326949 A1 (XU, S. et al.) 6 November 2014 (06-11-2014)	1-4, 8-10
-----	* paragraphs ¶¶ [0008], [0022], [0023], [0032], [0062]-[0063], [0086]; Figs.1a, 1b*	-----
Y		1-32
Y	WO 2014/181072 A1 (CHARBONNEAU, C. et al.) 13 November 2014 (13-11-2014)	1-32
	* page 2, lines 16-17; page 3, lines 3-11, 20-21; page 4, lines 22-23; page 5, lines 3-13, 23-24; page 10, lines 18-20; page 9, lines 8-9; Fig.2*	
A	WO 2016/083783 A1 (FRIEND, R. et al.) 2 June 2016 (02-06-2016)	
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☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* "A" "E" "L" "O" "P"	Special categories of cited documents: document defining the general state of the art which is not considered to be of particular relevance earlier application or patent but published on or after the international filing date 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) document referring to an oral disclosure, use, exhibition or other means document published prior to the international filing date but later than the priority date claimed	"I" "X" "Y" "&"	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 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 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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Albert Lau (819) 953-5206

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CA2016/050244

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