

**PATENT COOPERATION TREATY**

**PCT**

**INTERNATIONAL SEARCH REPORT**

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 232217-408550	<b>FOR FURTHER ACTION</b>		see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/US2017/018053	International filing date ( <i>day/month/year</i> ) 16 February 2017 (16-02-2017)	(Earliest) Priority Date ( <i>day/month/year</i> ) 17 February 2016 (17-02-2016)	
Applicant  EOS ENERGY STORAGE, LLC			

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 5 sheets.

It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the report**

a. With regard to the **language**, the international search was carried out on the basis of:

- the international application in the language in which it was filed  
 a translation of the international application into \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

b.  This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).

c.  With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2.  **Certain claims were found unsearchable** (See Box No. II)

3.  **Unity of invention is lacking** (see Box No III)

4. With regard to the **title**,

- the text is approved as submitted by the applicant  
 the text has been established by this Authority to read as follows:

HALOGEN-BASED ELECTROLYTE CONTAINING CARBON

5. With regard to the **abstract**,

- the text is approved as submitted by the applicant  
 the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority

6. With regard to the **drawings**,

- a. the figure of the **drawings** to be published with the abstract is Figure No. \_\_\_\_\_  
 as suggested by the applicant  
 as selected by this Authority, because the applicant failed to suggest a figure  
 as selected by this Authority, because this figure better characterizes the invention
- b.  none of the figures is to be published with the abstract

Box No. IV Text of the abstract (Continuation of item 5 of the first sheet)

#### HALOGEN BASED ELECTROLYTE CONTAINING CARBON

The present invention provides an electrolyte including a zinc halide salt, water, and carbon powder. The zinc halide salt is selected from  $\text{ZnBr}_2$ ,  $\text{ZnCl}_2$ ,  $\text{ZnI}_2$ , or any combination thereof. The electrolyte may include from about 25 wt% to about 50 wt% of the zinc halide salt. The electrolyte may include from about 25 wt% to about 50 wt% of the carbon powder. The zinc halide salt preferably includes  $\text{ZnBr}_2$ . The electrolyte may include 28 wt% to about 37 wt% of  $\text{ZnBr}_2$ . The electrolyte may be used in zinc-halide rechargeable electrochemical cells (e.g. storage batteries).

INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2017/018053

A. CLASSIFICATION OF SUBJECT MATTER  
INV. H01M10/36 H01M12/08  
ADD.  
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)  
H01M  
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, INSPEC, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2001 110461 A (MEIDENSHA ELECTRIC MFG CO., LTD.) 20 April 2001 (2001-04-20)	1-6,9, 10, 21-23, 44-49, 52,53
A	abstract paragraph [0037] - paragraph [0041]	7,8, 11-20, 24-43, 50,51,54
A	----- CN 103 413 992 A (SHANGHAI HUADING TECHNOLOGY AND EDUCATION EQUIPMENT CO., LTD.) 27 November 2013 (2013-11-27) abstract ----- -/--	1-54

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	"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
"E" earlier application or patent but published on or after the international filing date	"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
"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)	"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
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search <b>6 April 2017</b>	Date of mailing of the international search report <b>18/04/2017</b>
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer <b>Masson, Jean-Pierre</b>
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## INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2017/018053

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>WO 2013/168145 A1 (BROMINE COMPOUNDS LTD.) 14 November 2013 (2013-11-14) page 7, line 30 - page 8, line 23 page 12, line 26 - page 13, line 4 examples 1-5; table 1 examples 6-8; table 2 examples 9, 10; table 3 example 11; table 4 examples 12-14; table 5 examples 15-20; table 6 claims 1-15</p> <p style="text-align: center;">-----</p>	1-54
A	<p>US 4 510 218 A (MEIDENSHA ELECTRIC MFG CO., LTD.) 9 April 1985 (1985-04-09) column 2, lines 24-50 column 2, line 61 - column 3, line 30 column 3, line 62 - column 6, line 21 example 1; table 1 example 2; table 2 claims 1-8</p> <p style="text-align: center;">-----</p>	1-54
A	<p>US 4 473 625 A (FURUKAWA ELECTRIC CO., LTD.) 25 September 1984 (1984-09-25) column 2, lines 9-55 example 1; table 1 claims 1-5</p> <p style="text-align: center;">-----</p>	1-54
A	<p>US 4 058 651 A (GENERAL ELECTRIC CO.) 15 November 1977 (1977-11-15) column 1, line 61 - column 2, line 2 column 2, line 52 - column 3, line 3 column 3, line 43 - column 4, line 2 examples I-V claims 1, 5, 6</p> <p style="text-align: center;">-----</p>	1-54

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2017/018053

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 2001110461	A	20-04-2001	NONE
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CN 103413992	A	27-11-2013	NONE
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WO 2013168145	A1	14-11-2013	AU 2013257586 A1 25-09-2014
			CN 104350641 A 11-02-2015
			EP 2847822 A1 18-03-2015
			US 2015155584 A1 04-06-2015
			WO 2013168145 A1 14-11-2013
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US 4510218	A	09-04-1985	JP S59111277 A 27-06-1984
			US 4510218 A 09-04-1985
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US 4473625	A	25-09-1984	DE 3314667 A1 27-10-1983
			FR 2525822 A1 28-10-1983
			GB 2122019 A 04-01-1984
			JP H0636375 B2 11-05-1994
			JP S58186174 A 31-10-1983
			US 4473625 A 25-09-1984
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US 4058651	A	15-11-1977	NONE
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