

**PATENT COOPERATION TREATY**

**PCT**

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference IP160253	<b>FOR FURTHER ACTION</b>		See item 4 below
International application No. PCT/CN2016/087896	International filing date ( <i>day/month/year</i> ) 30 June 2016 (30.06.2016)	Priority date ( <i>day/month/year</i> ) 30 June 2015 (30.06.2015)	
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237			
Applicant RAYCHEM ELECTRONICS (SHANGHAI) LTD.			

<p>1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a).</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p>In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.</p>																								
<p>3. This report contains indications relating to the following items:</p> <table> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. I</td> <td>Basis of the report</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table> <p>4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).</p>	<input checked="" type="checkbox"/>	Box No. I	Basis of the report	<input type="checkbox"/>	Box No. II	Priority	<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	<input type="checkbox"/>	Box No. IV	Lack of unity of invention	<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	<input type="checkbox"/>	Box No. VI	Certain documents cited	<input type="checkbox"/>	Box No. VII	Certain defects in the international application	<input type="checkbox"/>	Box No. VIII	Certain observations on the international application
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	Date of issuance of this report 02 January 2018 (02.01.2018)
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**PATENT COOPERATION TREATY**

**TRANSLATION**

From the  
INTERNATIONAL SEARCHING AUTHORITY

**PCT**

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

Date of mailing (day/month/year)	<b>29.08.2016</b>
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Applicant's or agent's file reference  
**IP160253**

**FOR FURTHER ACTION**  
See paragraph 2 below

International application No. <b>PCT/CN2016/087896</b>	International filing date (day/month/year) <b>30.06.2016</b>	Priority date (day/month/year) <b>30.06.2015</b>
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International Patent Classification (IPC) or both national classification and IPC  
**C08L23/06 (2006.01) i; C08L23/12 (2006.01) i; C08L23/16 (2006.01) i; C08L23/08 (2006.01) i;  
 C08L27/12 (2006.01) i; C08K3/08 (2006.01) i; C08K3/14 (2006.01) i; H01C7/02 (2006.01) i**

Applicant  
**RAYCHEM ELECTRONICS (SHANGHAI) LTD.**

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/CN	Date of completion of this opinion	Authorized officer
Facsimile No.		Telephone No.

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/CN2016/087896

**Box No. I**      **Basis of this opinion**

1. With regard to the **language**, this opinion has been established 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)).
  
2.  This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))
  
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished:
  - a. (means)
    - on paper
    - in electronic form
  - b. (time)
    - in the international application as filed
    - together with the international application in electronic form
    - subsequently to this Authority for the purposes of search
  
4.  In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
  
5. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/CN2016/087896

<b>Box No. V</b>	<b>Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</b>		
1. Statement	Novelty (N)	Claims <u>1-28</u> Claims <u>None</u>	YES NO
	Inventive step (IS)	Claims <u>1-28</u> Claims <u>None</u>	YES NO
	Industrial applicability (IA)	Claims <u>1-28</u> Claims <u>None</u>	YES NO
2. Citations and explanations:			
[1]	D1:	CN 103594215 A (19 February 2014)	
[2]	D2:	JP 2005183750 A (07 July 2005)	
[3]	D3:	JP 2003318008 A (07 November 2003)	
[4]	Novelty:		
[5]	D1 discloses a PTC composite material which comprises crystallinity high molecular polymers, TiC high conductivity nanoparticle powder of which a particle size is 1-50 nm, and TiC conductivity microparticle powder of which particle size is 0.1-10 µm; a weight ratio of the two types of particle powder is 0.1-1 : 9-9.9.		
[6]	D2 discloses a PTC composite material which comprises crystallinity high molecular polymers and two types of conductivity particles of difference particle sizes; wherein, an average particle size ratio between the big particle and		

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/CN2016/087896

Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

the small particle is 1 : 0.5 - 1 : 0.75, and a volume ratio is 50 : 50 - 30 : 70.

[7] D3 discloses a polymer PTC composition which comprises crystallinity high molecular polymers, conductivity powder of which a particle size is 0.2-20  $\mu\text{m}$ , and conductivity powder of which a particle size is 20-200  $\mu\text{m}$ .

[8] None of above D1-D3 discloses that size distribution of the conductivity powder satisfies  $20 > D_{100}/D_{50} > 6$ . Accordingly, claims 1-28 of the present application are novel in the sense of PCT Article 33(2).

[9] Inventive Step:

[10] In the present application, super low resistivity can be obtained by using conductivity powder of wide size distribution ( $20 > D_{100}/D_{50} > 6$ ). None of D1-D3 has the technical suggestion. Accordingly, claims 1-28 involve an inventive step in the sense of PCT Article 33(3).

[11] Industrial Applicability:

[12] The technical solutions of claims 1-28 of the present application can be used in the field of electrical component; therefore, claims 1-28 are industrially applicable in the sense of PCT Article 33(4).