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Declarations under Rule 4.17:
— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:
— *with international search report (Art. 21(3))*
— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

(88) Date of publication of the international search report:
28 November 2019 (28.11.2019)

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(54) Title: METHODS FOR PREPARING CARBON MATERIALS

(57) Abstract: The present application is directed to compositions and methods of preparing carbon materials. The carbon materials prepared according to compositions and methods described herein comprise enhanced electrochemical properties and find utility in any number of electrical devices, for example, as electrode material in ultracapacitors.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2019/014984

A. CLASSIFICATION OF SUBJECT MATTER
INV. C08G8/20
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)
C08G C09J

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2012/092210 A1 (ENERG2 TECHNOLOGIES INC [US]; CHANG ALAN T [US] ET AL.) 5 July 2012 (2012-07-05) examples 1-2	1-10, 42-123
X	WO 2017/066703 A1 (ENERG2 TECH INC [US]; FREDRICK SARAH [US] ET AL.) 20 April 2017 (2017-04-20) examples 1,5	1-10, 42-123
X	US 2012/081838 A1 (COSTANTINO HENRY R [US] ET AL) 5 April 2012 (2012-04-05) examples 1,2	1-10, 42-123
X	US 2011/223494 A1 (FEAVER AARON M [US] ET AL) 15 September 2011 (2011-09-15) examples 1,2	1,2,42, 122,123

☐ 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

"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	Date of mailing of the international search report
13 August 2019	23/10/2019

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Zellner, Armin

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2019/014984

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-10(completely); 42-123(partially)

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-10(completely); 42-123(partially)

   A method comprising combining a solvent, a catalyst, a first monomer and a second monomer to yield a reaction mixture; increasing the temperature of the reaction mixture at a holding ramp rate and holding the reaction mixture at a holding temperature sufficient to co-polymerize the first and second monomer to yield a polymer composition.

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2. claims: 11-18(completely); 42-123(partially)

   A method comprising combining a solvent, a catalyst, a first monomer and a second monomer to yield a reaction mixture, and maintaining the reaction mixture at a reaction temperature for a reaction time; increasing the temperature of the reaction mixture at a holding ramp rate and holding the reaction mixture at a holding temperature sufficient to co-polymerize the first and second monomer to yield a polymer composition.

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3. claims: 19-27(completely); 42-123(partially)

   A method comprising combining a solvent, a catalyst, a first monomer and a second monomer to yield a reaction mixture; increasing the temperature of the reaction mixture at a holding ramp rate and holding the reaction mixture for a holding time at a holding temperature sufficient to co-polymerize the first and second monomer to yield a polymer composition.

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4. claims: 28-30(completely); 42-123(partially)

   A method comprising combining a solvent, a catalyst, a first monomer and a second monomer to yield a reaction mixture; heating the polymer composition by increasing an initial temperature at a curing ramp rate of at least 0.5 °C/hour up to a curing temperature, thereby forming a cured polymer composition comprising the solvent and a polymer formed from co-polymerizing the first and second monomer.
   increasing the temperature of the reaction mixture at a holding ramp rate and holding the reaction mixture at a holding temperature sufficient to co-polymerize the monomers to yield a polymer composition.

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5. claims: 31-41(completely); 42-123(partially)

   A method comprising combining a solvent, a catalyst, a first monomer and a second monomer to yield a reaction mixture;

transferring the reaction mixture to a reaction vessel having a volume greater than 10 L and a surface area to volume aspect ratio greater than about 3 m2/m3; increasing the temperature of the reaction mixture at a holding ramp rate and holding the reaction mixture at a holding temperature sufficient to co-polymerize the first and second monomer to yield a polymer composition.

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6. claims: 124-158

A polymer composition comprising a solvent concentration greater than about 10 wt.% of the polymer composition; and a polymer having a relative pore integrity greater than 0.4.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2019/014984

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