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- (71) Applicant (for all designated States except US): **E. I. DU PONT DE NEMOURS AND COMPANY** [US/US];
1007 Market Street, Wilmington, Delaware 19898 (US).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): **ROBIN, Mark, L.**
[US/US]; 107 Saint Andrews Court, Middletown,
Delaware 19709 (US).

- (74) Agent: **HEISER, David, E.**; E. I. du Pont de Nemours and Company, Legal Patent Records Center, 4417 Lancaster Pike, Wilmington, Delaware 19805 (US).
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[Continued on next page]

(54) Title: AZEOTROPIC AND AZEOTROPE-LIKE COMPOSITIONS INVOLVING CERTAIN HALOOLEFINS AND USES THEREOF

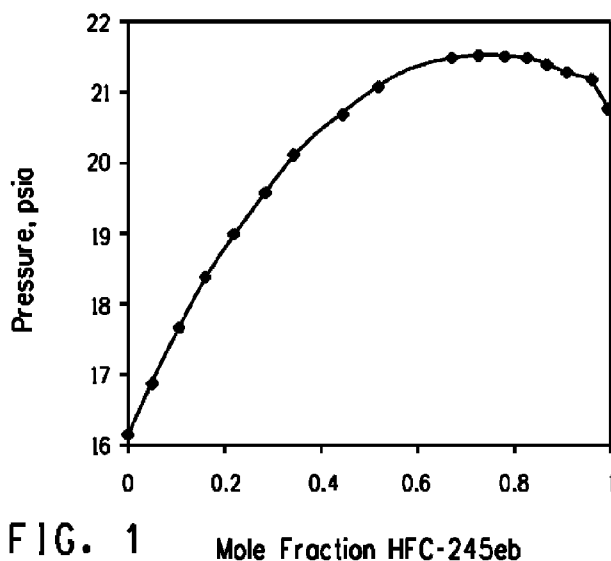


FIG. 1 Mole Fraction HFC-245eb

(57) Abstract: Azeotropic or azeotrope-like compositions are disclosed. The azeotropic or azeotrope-like compositions are mixtures of (A) a compound of the formula $CF_3CX=CHR_a$ where X is H or F and R_a is CF_3CF_2 , CF_3 or Cl, provided that (i) when X is F, R_a is Cl, (ii) when R_a is CF_3CF_2 or Cl, the compound of formula $CF_3CX=CHR_a$ is the E configurational isomer, and (iii) when R_a is CF_3 , the compound of formula $CF_3CX=CHR_a$ is the Z configurational isomer; and (B) a compound of the formula CF_3R_b where R_b is CH₂F or CH=CHCF₃, provided that when R_b is CH=CHCF₃, X is F and the compound of formula CF_3R_b is the Z configurational isomer. Also disclosed are processes for using such azeotropic or azeotrope-like compositions for preparing a thermoplastic or thermoset foam, for producing refrigeration, for producing an aerosol product and for extinguishing and suppressing a fire; and as blowing agents, solvents, heat transfer media and dielectrics.

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INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
INV. C09K3/30 C09K5/04 C08J9/00
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)
C09K C08J

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.
A	US 2010/243943 A1 (ROBIN MARK L [US]) 30 September 2010 (2010-09-30) paragraphs [0005], [0013], [0074]; tables 16,17	1-3, 10-17
A	----- WO 2010/141527 A1 (DU PONT [US]; ROBIN MARK L [US]) 9 December 2010 (2010-12-09) page 22, paragraph 2; figures 2,10; tables 4,5,25,26	1,9-17
A	----- US 2011/001080 A1 (VAN HORN BRETT L [US] ET AL) 6 January 2011 (2011-01-06) paragraphs [0001], [0002], [0012] - [0015]	1,4,5, 10-15
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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
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- "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 1 October 2012	Date of mailing of the international search report 08/10/2012
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 Martinez Marcos, V

INTERNATIONAL SEARCH REPORT

International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 558 810 A (MINOR BARBARA H [US] ET AL) 24 September 1996 (1996-09-24) column 1, lines 5-12 column 3, line 66 - column 4, line 34 column 6, lines 22-65 -----	1,10-17
X,P	WO 2011/084553 A2 (HONEYWELL INT INC [US]; HULSE RYAN [US]; ZYHOWSKI GARY JOHN [US]; HOFM) 14 July 2011 (2011-07-14) page 2, paragraph 1 - last paragraph page 8, paragraph 1; table 1 -----	1,8, 10-17
X,P	WO 2011/022260 A1 (ARKEMA INC [US]; VAN HORN BRETT L [US]; BONNET PHILIPPE [FR]; ABBAS LA) 24 February 2011 (2011-02-24) page 1, paragraph 1-3; figure 1; example 1 -----	1,4,5, 10-17

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/023704

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.:

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: 2-8(completely); 1, 10-17(partially)

azeotropic or azeotrope-like compositions comprising HFC245eb and a fluoroolefin selected from HF01438mzz(E), HF01336mzz(Z), HF01233zd(E) and HF01224yd(E).

2. claims: 9(completely); 1, 10-17(partially)

azeotropic or azeotrope-like compositions comprising HF01224yd(E) and HF01336mzz(Z)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2012/023704

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