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## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>6</sup> :</b> <b>C08F 210/16, 36/06, 36/08, 2/34, 4/52</b>	<b>A3</b>	<b>(11) International Publication Number:</b> <b>WO 96/04323</b> <b>(43) International Publication Date:</b> 15 February 1996 (15.02.96)
<b>(21) International Application Number:</b> PCT/US95/09827 <b>(22) International Filing Date:</b> 2 August 1995 (02.08.95) <b>(30) Priority Data:</b> 284,797 2 August 1994 (02.08.94) US <b>(71) Applicant (for all designated States except US):</b> UNION CARBIDE CHEMICALS & PLASTICS TECHNOLOGY CORPORATION [US/US]; 39 Old Ridgebury Road, Danbury, CT 06817-0001 (US). <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only):</b> CANN, Kevin, Joseph [US/US]; 31 Montgomery Avenue, Rocky Hill, NJ 08522 (US). APECETCHE, Maria, Angelica [AR/US]; Apartment D-12, 290 River Road, Piscataway, NJ 08854 (US). MOORHOUSE, John, Henry [US/US]; 17 Constable Road, Kendall Park, NJ 08824 (US). MURUGANANDAM, Natarajan [IN/US]; 26 New Amwell Road, Somerville, NJ 08876 (US). SMITH, Gregory, George [US/US]; 1 Piedmont Path, Belle Mead, NJ 08502 (US). WILLIAMS, Gary, Harry [US/US]; 29 Fir Court, Flemington, NJ 08822 (US).	<b>(74) Agent:</b> JOHNSON, Karen, L.; Union Carbide Chemicals & Plastics Technology Corporation, 39 Old Ridgebury Road, Danbury, CT 06817-0001 (US). <b>(81) Designated States:</b> AU, BR, CA, CN, CZ, HU, JP, KR, MX, PL, RU, SG, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). <b>Published</b> <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> <b>(88) Date of publication of the international search report:</b> 4 April 1996 (04.04.1996)	
<b>(54) Title:</b> GAS PHASE PRODUCTION OF POLYDIENES <b>(57) Abstract</b> <p>A process for producing polybutadiene or polyisoprene in a gas phase reactor by continuously introducing a stream of butadiene or isoprene monomer and optionally an inert gas into a polymerization zone while maintaining the temperature within the polymerization zone below the dew point temperature of the monomer present in said polymerization zone in the presence of a rare earth catalyst and in the presence of inert particulate material.</p>		

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# INTERNATIONAL SEARCH REPORT

Intern: al Application No  
PCT/US 95/09827

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 C08F210/16 C08F36/06 C08F36/08 C08F2/34 C08F4/52

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 6 C08F

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 practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP,A,0 456 437 (SUMITOMO RUBBER IND) 13 November 1991 see claims ---	27-34
Y	EP,A,0 241 947 (UNION CARBIDE CORP) 21 October 1987 see the whole document	1-26, 42
Y	& US,A,4 543 399 cited in the application	1-26, 42
Y	& US,A,4 588 790 cited in the application ---	1-26, 42
Y	US,A,4 994 534 (RHEE SEUNG J ET AL) 19 February 1991 cited in the application see column 2, line 62 - column 4, line 16 see column 4, line 61 - column 6, line 34 see claims; examples --- -/--	1-26, 42

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents :

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- "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

2 February 1996

Date of mailing of the international search report

19. 02. 96

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Kaumann, E

# INTERNATIONAL SEARCH REPORT

Intern    al Application No  
PCT/US 95/09827

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US,A,4 803 251 (GOODE MARK G ET AL) 7 February 1989 cited in the application see claims ---	1-26,42
Y	EP,A,0 386 808 (ENICHEM ELASTOMERS) 12 September 1990 see examples ---	1-26,42
A	US,A,4 575 538 (HSIEH HENRY L ET AL) 11 March 1986 see examples ---	1-42
P,X	EP,A,0 647 657 (BAYER AG) 12 April 1995 cited in the application see the whole document ---	35-41
Y	DATABASE WPI Section Ch, Week 8320 Derwent Publications Ltd., London, GB; Class A12, AN 83-48192K & JP,A,58 061 107 ( JAPAN SYNTHETIC RUBBER) , 12 April 1983 see abstract ---	35-41
Y	EP,A,0 011 184 (BAYER AG) 28 May 1980 see page 5, line 9 - page 11, line 22; claims -----	35-41

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US95/09827

**Box I Observations where certain claims were found unsearchable (Continuation of item 1 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 II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)**

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

1. Claims : 1-34 A process for producing Polybutadiene
2. Claims : 35-41 A method of making a catalyst

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 fee, this Authority did not invite payment of any additional fee.
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.
- ☐ No protest accompanied the payment of additional search fees.

# INTERNATIONAL SEARCH REPORT

...formation on patent family members

International Application No

PCT/US 95/09827

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PCT/US 95/09827

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