

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
20 September 2007 (20.09.2007)

PCT

(10) International Publication Number
WO 2007/106459 A3

(51) International Patent Classification:
C01B 35/14 (2006.01)

(21) International Application Number:
PCT/US2007/006263

(22) International Filing Date: 12 March 2007 (12.03.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/781,834 13 March 2006 (13.03.2006) US
60/817,911 30 June 2006 (30.06.2006) US

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

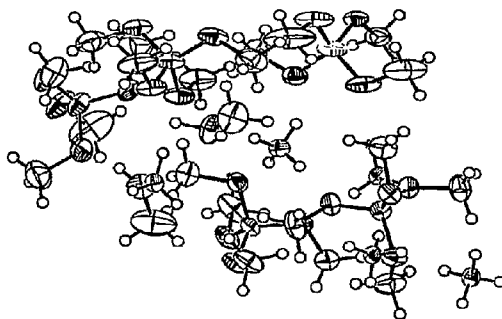
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:
27 March 2008

(54) Title: IMPROVED PROCESS FOR THE SYNTHESIS AND METHANOLYSIS OF AMMONIA BORANE AND BORAZINE



(57) Abstract: The present invention provides an improved process for the synthesis and methanolysis of ammonia borane and borazine.



WO 2007/106459 A3

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2007/006263

A. CLASSIFICATION OF SUBJECT MATTER
INV. C01B35/14

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)

C01B

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)

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.
X	M.G. HU, J.M. VAN PAASSCHEN, R.A. GEANAGEL: "New synthetic approaches to ammonia-borane and its deuterated derivatives" JOURNAL OF INORGANIC AND NUCLEAR CHEMISTRY, vol. 39, 1977, pages 2147-2150, XP002441891	1-5, 10-17
Y	Experimental, Results and Discussion, pages 2147-2149	6-9
Y	S.G. SHORE, R.W. PARRY: "The crystalline compound ammonia borane H ₃ NBH ₃ " JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, vol. 77, 1955, pages 6084-6085, XP002441892	6-9
A	the whole document	1-3,5

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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 document 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

24 July 2007

Date of mailing of the international search report

08/02/2008

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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2007/006263

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	S.G. SHORE, R.W. PARRY: "Chemical Evidence for the Structure of the "Diammoniate of Diborane." II. The Preparation of Ammonia-Borane" JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, vol. 80, 1958, pages 8-12, XP002441893 section "The Reaction between Lithium Borohydride and Ammonium Salts in an Ether Slurry" -----	6-9
A		1-3,5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2007/006263

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 allsearchable 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 reportcovers 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.:

1-17

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: 1-17

Process for preparing ammonia borane comprising the reaction of a metal borohydride with an ammonium salt.

2. claims: 18-26

Process for generating hydrogen comprising the reaction of ammonia borane with a solvent in the presence of a metal catalyst.

3. claim: 27

Process for generating hydrogen comprising the reaction of borazine with a solvent in the presence of a metal catalyst.

4. claims: 28-39

Process for regenerating ammonia borane from ammonium tetramethoxyborate, comprising the reaction of ammonium tetramethoxyborate with an ammonium salt and a metal hydride.
