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— *with international search report (Art. 21(3))*

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22 October 2009

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(54) Title: TUNGSTEN OXIDES USED TO INCREASE THE HEAT-INPUT AMOUNT OF NEAR INFRARED RADIATION

(57) Abstract: The invention relates to the use of tungsten oxide or of tungstate to increase the heat-input amount of near infrared radiation in processes selected from laser welding of plastics, NIR curing of coatings, drying of printing inks, fixing of ink toners to a substrate, heating of plastic preforms, laser marking of plastics or paper.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2008/064335

A. CLASSIFICATION OF SUBJECT MATTER
INV. B32B27/16 C08K3/22 C09K5/14 B32B37/06

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)
B32B C08K C09K

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.
A	EP 1 847 635 A (SUMITOMO METAL MINING CO [JP]) 24 October 2007 (2007-10-24) cited in the application * page 4, paragraph [0034] through page 5, paragraph [0039], claims *	1-5,21, 22
P,A	EP 1 859 674 A (SUMITOMO METAL MINING CO [JP]) 28 November 2007 (2007-11-28) * column 4, paragraph [0021] through column 5, paragraph [0022], column 8, paragraph [0035] through column 9, paragraph [0039] *	1-5,21, 22
A	& WO 2006/100799 A (SUMITOMO METAL MINING CO [JP]; YABUKI KAYO [JP]; TAKEDA HIROMITSU [JP]) 28 September 2006 (2006-09-28)	1-5,21, 22

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[X] Further documents are listed in the continuation of Box C.

[X] 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	Date of mailing of the international search report
13 January 2009	20/08/2009

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	Nemes, Csaba A.

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2008/064335

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2007/019951 A (MERCK PATENT GMBH [DE]; EDLER GERHARD [DE]; LINZMEIER RAINER [DE]) 22 February 2007 (2007-02-22) * page 1, lines 1-13, page 2, line 19 through page 3, line 23, page 4, line 28 through page 5, line 5, page 8, lines 15-31, examples, claims *	1-5,21, 22
A	WO 03/059619 A (GENTEX CORP [US]) 24 July 2003 (2003-07-24) the whole document	1-5,21, 22

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2008/064335

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.:

1-5, 21(part), 22(part)

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: 1-5,21(part),22(part)

   Use of tungsten oxide of the formula WO3-x (x = 0.1-1) and/or the tungstate of the formula MxWyOz as defined in claim 1 to increase the heat-input amount of near infrared radiation in the process of NIR curing of coatings and NIR drying of coatings.

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2. claims: 6-8,21(part),22(part)

   Use of tungsten oxide of the formula WO3-x (x = 0.1-1) and/or the tungstate of the formula MxWyOz as defined in claim 1 to increase the heat-input amount of near infrared radiation in the process of laser marking of plastics.

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3. claims: 9-11,21(part),22(part)

   Use of tungsten oxide of the formula WO3-x (x = 0.1-1) and/or the tungstate of the formula MxWyOz as defined in claim 1 to increase the heat-input amount of near infrared radiation in the process of laser welding of plastics.

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4. claims: 12-14,21(part),22(part)

   Use of tungsten oxide of the formula WO3-x (x = 0.1-1) and/or the tungstate of the formula MxWyOz as defined in claim 1 to increase the heat-input amount of near infrared radiation in the process of NIR curing of adhesives and sealants and NIR drying of adhesives and sealants.

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5. claims: 15-17,21(part),22(part)

   Use of tungsten oxide of the formula WO3-x (x = 0.1-1) and/or the tungstate of the formula MxWyOz as defined in claim 1 to increase the heat-input amount of near infrared radiation in the process of laser marking of paper.

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6. claims: 18-20,21(part),22(part)

   Use of tungsten oxide of the formula WO3-x (x = 0.1-1) and/or the tungstate of the formula MxWyOz as defined in claim 1 to increase the heat-input amount of near infrared radiation in the process of drying of printing inks or fixing of ink toners to a substrate.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2008/064335

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