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C25D 11/04 (2006.01) *C25D 13/02* (2006.01)
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(54) Title: NON-METALLIC COATING AND METHOD OF ITS PRODUCTION

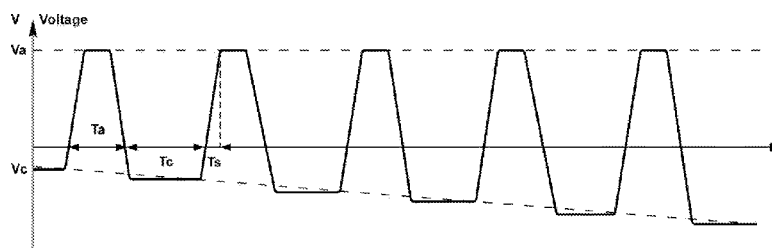


Figure 4

(57) Abstract: A method of forming a non-metallic coating on a metallic substrate involves the steps of positioning the metallic substrate in an electrolysis chamber and applying a sequence of voltage pulses of alternating polarity to electrically bias the substrate with respect to an electrode. Positive voltage pulses anodically bias the substrate with respect to the electrode and negative voltage pulses cathodically bias the substrate with respect to the electrode. The amplitude of the positive voltage pulses is potentiostatically controlled, whereas the amplitude of the negative voltage pulses is galvanostatically controlled.



WO 2012/107754 A3

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2012/050268

A. CLASSIFICATION OF SUBJECT MATTER			
INV.	C25D5/18	C25D11/00	C25D11/04
	C25D11/32	C25D13/02	C25D21/12
			C25D11/26
			C25D11/30
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) C25D			
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 96/24391 A1 (UNIV DRESDEN TECH [DE]; SCHARNWEBER DIETER [DE]; BERSCH HENRIKE [DE];) 15 August 1996 (1996-08-15)	1-13, 25-28, 30-34	
Y	page 3, paragraph 3 - page 5, last paragraph	14-19,29	

X	US 5 486 280 A (BULLOCK IV JONATHAN S [US] ET AL) 23 January 1996 (1996-01-23)	1-13, 25-28, 30-33	
Y	abstract column 3, line 46 - column 4, line 50	14-19,29	

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<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> 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	
31 October 2012		19/11/2012	
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	

INTERNATIONAL SEARCH REPORT

International application No.
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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.: **37, 38(completely); 1-36(partially)**
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:
see FURTHER INFORMATION sheet PCT/ISA/210

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.:
1-19(completely); 25-36(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: 1-19(completely); 25-36(partially)

Method of forming a non-metallic coating on a surface of a metallic or a semi-metallic substrate by applying bipolar electric pulses, whereby the amplitude of the positive voltage pulses is potentiostatically controlled and the amplitude of the negative pulses is galvanostatically controlled.

2. claims: 20-24(completely); 25-36(partially)

Method of forming a non-metallic coating on the surface of a metallic or semi-metallic substrate by applying bipolar electric pulses, whereby the electrolyte is colloidal and comprises solid particles dispersed in an aqueous phase.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 37, 38(completely); 1-36(partially)

The present application contains 38 claims, of which 7 are independent. There is no clear distinction between the independent claims because of overlapping scope. The claims as a whole are not in compliance with the provisions of clarity and conciseness of Article 6 PCT, as it is particularly burdensome for a skilled person to establish the subject-matter for which protection is sought. There are so many claims, and they are drafted in such a way that the non-compliance with the substantive provisions is to such an extent, that the search was performed taking into consideration the non-compliance in determining the extent of the search (PCT Guidelines 9.19 and 9.25). - The initial phase of the search revealed a very large number of documents relevant to the issue of novelty, since claims 1 to 19, 25 to 29 relate to an extremely large number of possible methods, electroplating other than with metals (C25D9), electrolytic conversion coating (C25D11), electrophoretic plating (C25D13), electroplating with embedded particles (C25D15). - Claims 20 to 24 are not clear either, because the fact that the non-metallic layer is "formed during periods of the cycle during which the substrate is anodic with respect to the electrode", does not exclude an electrophoretic deposition with negative charged particles (class C25D13) or an electrolytic coating other than with metals by an anodic process (class C25D9). - Claims 30 and 31 relate to an extremely large number of possible apparatus, not only limited to one for forming a non-metallic coating. Indeed, said claims do not comprise "enough" technical features to characterise the apparatus itself (claim 31 only relates to the electrolyte which shall be used). Thus, no exhaustive search on those claims could be done Those apparatus claims are a priori considered as not novel. - Claim 32 is a product-by process claim. Where a claim defines a product in terms of the method by which the product is made, the claim as a whole is directed to a product. Such a claim lacks novelty if a prior art product, even if made by an undisclosed process, appears to be inherently the same as or indistinguishable from, the claimed invention (see the PCT Guidelines 5.26, and A5.26[1]). - The product claims 33 to 36 are defined by general properties which can be obtained by using a method which has not been taken into consideration in the present application, like CVD, sputtering etc. Since the product obtained otherwise might be inherently the same as or indistinguishable from, the claimed product, and in view of the large search fields of different methods which can be used to manufacture said product, no exhaustive search could be done, and the claimed product is a priori considered as lacking novelty. The search was limited to a process in the field of class C25D. - Claims 37 and 38 are so unclear according to article 6 PCT that they could not be searched at all.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.2), should the problems which led to the Article 17(2) declaration be overcome.

INTERNATIONAL SEARCH REPORT

 International application No
 PCT/GB2012/050268

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 887 361 B1 (VISCO STEVEN J [US] ET AL) 3 May 2005 (2005-05-03) abstract column 3, lines 10-51 column 13, lines 37-49 column 17; example 1 column 10, line 40 - column 11, line 23 -----	1-29,32,33
X	WO 2008/120046 A1 (GOSTEVS VLADIMIRS [LV]) 9 October 2008 (2008-10-09) abstract page 2, lines 14-22 page 4, lines 12-30 page 6, line 24 - page 7, line 2 page 8, lines 23,24 page 10, lines 32,33 page 11, lines 6-15 page 12, lines 1-7 -----	1-19,33,34

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2012/050268

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9624391	A1	15-08-1996	
		AT 221789 T	15-08-2002
		AU 4618896 A	27-08-1996
		DE 19504386 A1	22-08-1996
		DK 756499 T3	14-10-2002
		EP 0756499 A1	05-02-1997
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		JP H10503108 A	24-03-1998
		PT 756499 E	31-12-2002
		US 5723038 A	03-03-1998
		WO 9624391 A1	15-08-1996

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WO 2008120046	A1	09-10-2008	
		EA 200901050 A1	30-12-2009
		WO 2008120046 A1	09-10-2008
