

SEARCH REPORT

Application Number

LH 36
LT 2023521

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	<p>LACK OF UNITY OF INVENTION see sheet B</p> <p>-----</p> <p>CN 110 499 500 A (XUNCHUANG TIANJIN ELECTRONICS CO LTD) 26 November 2019 (2019-11-26)</p> <p>* paragraph [0016] *</p> <p>* paragraph [0037] - paragraph [0052] *</p> <p>-----</p>	1, 9, 10, 12-14, 18, 19	INV. C23C18/16 C23C18/18
X	<p>Ratautas K.: "Lasser-assisted formation of electro-conductive circuit traces on dielectric materials by electroless metal plating technique",</p> <p>,</p> <p>1 January 2019 (2019-01-01), pages 1-128, XP093094926,</p> <p>Retrieved from the Internet: URL: https://www.ftmc.lt/ [retrieved on 2023-10-24]</p> <p>* Item 3.2; page 48 * * Item 3.4; page 50 * * Item 3.6; page 51 * * page 99; table 5 * * Summary; page 116 *</p> <p>-----</p>	1-15, 18, 19	TECHNICAL FIELDS SEARCHED (IPC)
			C23C

The present search report has been drawn up for all claims

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CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

Date of completion of the search

The Hague

26 October 2023

Examiner

Telias, Gabriela

T : theory or principle underlying the invention

E : earlier patent document, but published on, or

after the filing date

D : document cited in the application

L : document cited for other reasons

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& : member of the same patent family, corresponding document

LACK OF UNITY OF INVENTION
SHEET B

Application Number
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The Search Division considers that the present patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 15(completely); 1-14, 18, 19(partially)

Method for selective metal plating on a surface of an item
made of glass

2. claims: 16(completely); 1-14, 18, 19(partially)

Method for selective metal plating on a surface of an item
made of ceramic

3. claims: 17(completely); 1-14, 18, 19(partially)

Method for selective metal plating on a surface of an item
made of a metalloid

The search has been limited to the first subject.

**ANNEX TO THE SEARCH REPORT
ON LITHUANIAN PATENT APPLICATION NO.**

**LH 36
LT 2023521**

This annex lists the patent family members relating to the patent documents cited in the above-mentioned search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

26-10-2023

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
CN 110499500 A	26-11-2019	NONE	



WRITTEN OPINION

File No. LH36	Filing date (day/month/year) 01.06.2023	Priority date (day/month/year)	Application No. LT2023521
International Patent Classification (IPC) INV. C23C18/16 C23C18/18			
Applicant Fizini ir technologijos moksl centras			

This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of the opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the application
- Box No. VIII Certain observations on the application

	Examiner Telias, Gabriela
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WRITTEN OPINION

Application number
LT2023521

Box No. I Basis of this opinion

1. This opinion has been established on the basis of the latest set of claims filed before the start of the search.
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the application, this opinion has been established on the basis of a sequence listing:
 - a. forming part of the application as filed.
 - b. furnished subsequent to the filing date for the purposes of search,
 accompanied by a statement to the effect that the sequence listing does not go beyond the disclosure in the application as filed.
3. With regard to any nucleotide and/or amino acid sequence disclosed in the application, this opinion has been established to the extent that a meaningful opinion could be formed without a WIPO Standard ST.26 compliant sequence listing.
4. Additional comments:

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step, or to be industrially applicable have not been examined in respect of

the entire application
 claims Nos. 16, 17(completely); 1-14, 18, 19(partially)

because:

the said application, or the said claims Nos. relate to the following subject matter which does not require a search (*specify*):

the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):

the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed (*specify*):

no search report has been established for the whole application or for said claims Nos. 16, 17(completely); 1-14, 18, 19(partially)

a meaningful opinion could not be formed without the sequence listing; the applicant did not furnish a sequence listing complying with WIPO Standard ST.26.

See Supplemental Box for further details.

WRITTEN OPINION

Application number

LT2023521

Box No. IV Lack of unity of invention

1. The requirement of unity of invention is not complied with for the following reasons:

see separate sheet

2. This report has been established in respect of the following parts of the application:

all parts.

the parts relating to claims Nos. (see Search Report)

Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	4-6, 11(all partially)
	No: Claims	15(completely); 1-3, 7-10, 12-14, 18, 19(partially)
Inventive step (IS)	Yes: Claims	
	No: Claims	15(completely); 1-14, 18, 19(partially)
Industrial applicability (IA)	Yes: Claims	15(completely); 1-14, 18, 19(partially)
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VIII Certain observations on the application

see separate sheet

Re Item IV

Lack of unity of invention

1 It is considered that there are three subjects covered by the claims indicated as follows:

I. Claims: 15 (completely); 1-14, 18, 19 (partially)

Method for selective metal plating on a surface of an item made of glass

II. Claims: 16 (completely); 1-14, 18, 19 (partially)

Method for selective metal plating on a surface of an item made of ceramic

III. Claims: 17 (completely); 1-14, 18, 19 (partially)

Method for selective metal plating on a surface of an item made of a metalloid

1.1 The reasons for which the subjects are not so linked as to form a single general inventive concept, are as follows:

1.2 The prior art has been identified as D1 (CN110499500 A). Said document discloses a method to obtain a selective metal plating on a surface of a substrate, said method comprising the following steps:

- surface modification with a pulsed laser on the surface areas to be plated with metal,
- bringing the substrate with the laser-modified surface in contact with a pre-treatment solution,
- immersing the substrate in an activation bath which contains a metal, and
- electroless deposition of a metal layer,

wherein the pre-treatment solution contains an alcohol corresponding to the formula R-OH (see D1: [0016], [0037] to [0052] and item 3.1 below).

1.3 The common concept linking together the three subjects is the following:
A method to obtain a selective metallization on the surface of a substrate, said method comprising the steps listed under item 1.2 above.

1.4 This common concept is not novel as it is known from document D1.

1.5 Each of the three subjects represent alternatives for a material to provide the substrate. These alternatives are expressed by a "Markush claim".

1.6 When the Markush grouping is for alternatives of chemical compounds, they should be regarded as being of a similar nature where:

- (i) all alternatives have a common property or activity, and
- (ii) a common structure is present, i.e. a significant structural element is shared by all of the alternatives, or all alternatives belong to a recognised class of chemical compounds in the art to which the invention pertains.

1.7 A "significant structural element is shared by all of the alternatives" where the compounds share a common chemical structure which occupies a large portion of their structures, or, where the compounds have in common only a small portion of their structures, the commonly shared structure constitutes a structurally distinctive portion in view of existing prior art. The structural element may be a single component or a combination of individual components linked together.

1.8 The alternatives belong to a "recognised class of chemical compounds" if there is an expectation from the knowledge in the art that members of the class will behave in the same way in the context of the claimed invention, i.e. that each member could be substituted one for the other, with the expectation that the same intended result would be achieved.

1.9 There is no need for the significant structural element to be novel in absolute terms (i.e. novel per se). Rather, this expression means that in relation to the common property or activity there must be a common part of the chemical structure which distinguishes the claimed compounds from any known compounds having the same property or activity.

However, if it can be shown that at least one Markush alternative is not novel, unity of invention should be reconsidered. In particular, if the structure of at least one of the compounds covered by a Markush claim is known together with the property or technical effect under consideration, this is an indication of lack of unity of the remaining compounds (alternatives).

1.10 In the present case, item (ii) is not fulfilled for the following reasons:

- 1.11 The criteria mentioned under (ii), namely a common significant structural element shared by all of the alternatives or belonging to a recognised class of chemical compounds in the art to which the invention pertains, do not apply for this specific case (see the materials listed in claims 15, 16 and 17).
- 1.12 Also the fact that some of the alternatives, specifically glass, is known from D1 as a material suitable for carrying out the method described under item 1.2, is an indication of lack of unity.
- 1.13 Therefore, inventions I, II and III are not so linked as to form a single general inventive concept and the prescribed requirements for unity of the invention are consequently not fulfilled.

Subject I

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

D1 CN 110 499 500 A (XUNCHUANG TIANJIN ELECTRONICS CO LTD) 26 November 2019 (2019-11-26)

D2 Ratautas K.: "Lasser-assisted formation of electro-conductive circuit traces on dielectric materials by electroless metal plating technique", Doctoral dissertation, 2019, pages 1-128, XP093094926

- 2 The present application does not meet the criteria of patentability, because the subject-matter of claim 1 is not new.
- 2.1 D2 discloses a method for selective metal plating on a surface of an item made of glass, specifically, soda lime and fused silica glass, said method comprising the following steps:
 - surface modification with a pulsed laser on the surface areas to be plated with metal,

- bringing the item with the laser-modified surface in contact with a pre-treatment solution,
- immersing the item in an activation bath which contains a metal, and
- electroless deposition of a metal layer,

wherein the pre-treatment solution contains an alcohol corresponding to the formula R-OH (see item 3.1 below and D2: page 48, item 3.2, page 50, item 3.4, page 51, item 3.6 and summary on page 116).

The subject-matter of claims 1 and 15 is therefore not new.

2.2 D2 further discloses the subject-matter of claims:

- 2 (see D2: page 50, item 3.4)
- 3 (see D2: page 50, item 3.4 and page 99, table 5)
- 8, 10, 12, 13, 14 (see D2: page 51, item 3.6)
- 18, 19 (see D2: page 51, item 3.6)

2.3 It is considered that a value for the ambient humidity which is comprised within a range from 15% to 95% (see claim 7) is implicitly provided in the process known from D2, as said range of values would correspond to the usual ambient conditions (see also clarity objection under item 3.2)

2.4 Dependent claims 4 to 6, 9 and 11 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements of inventive step, the reasons being as follows:

2.5 There is no clear technical effect provided for the features mentioned in claims 4 to 6.

Said features are therefore considered as straightforward possibilities from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill, in order to carry out the laser processing step known from D2.

- 2.6 Claim 9: the adjustment of the time span for the activation step is considered as a matter of routine experimentation when starting from the teaching of D2.
- 2.7 The same argument as the one provided under item 2.5 applies to the subject-matter of claim 11.

Re Item VIII

Certain observations on the application

- 3 Claims 1 and 7 are not clear.
- 3.1 Claim 1 does not meet the requirement of clarity because the matter for which protection is sought is not clearly defined.

The claim attempts to define the subject-matter in terms of the result to be achieved, namely, a Coulomb explosion, during which, laser pulse radiation interacts with the item material creating a static electric charge on the item surface which initiates the formation of hydroxy groups on the laser-treated surface of the item by adsorbing water molecules from the environment, or a photochemical ablation (breaking of chemical bonds), during which, laser pulse radiation interacts with the item material and a static electric charge is formed on the item surface which initiates the formation of hydroxy groups on the laser-treated surface of the item by adsorbing water molecules from the environment.

The underlined expressions merely state the underlying problem, without providing the technical features necessary, that is, the parameters for operating the laser in order to achieve these results.

- 3.2 It is unclear in claim 7 if the humidity values apply for each of the process steps or for a specific one among those mentioned in claim 1. Additionally, if the values provided in the claim are to be understood as the relative humidity (RH), the temperature for measuring said parameter would also be required.