第 39 回化学　問題・原文ファイル

★★★　＜第 39 回知的財産翻訳検定試験【第 19 回英文和訳】＞　★★★

≪化学分野≫

【解答にあたっての注意】

１．問題の指示により、「翻訳課題」と「チェック課題」があります。翻訳課題では翻訳し、チェック課題では既存の訳文をチェックしてください。解答は別紙「解答ファイル」に記載してください。

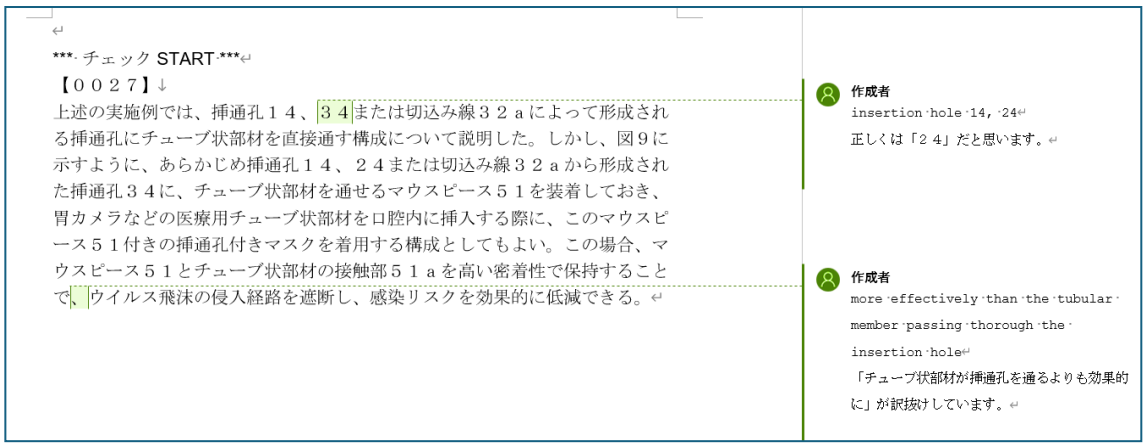
２．翻訳が求められる箇所は、*** 翻訳 START ***から*** 翻訳 END ***までの範囲です。

３．チェックが求められる箇所は、*** チェック START ***から*** チェック END ***までの範囲です。チェック対象の訳文は「解答ファイル」に記載されています。

４．チェック課題の解答方式

- 訳文の編集はせずに、訳文の不適切な箇所を指摘したうえで、正しい訳とその根拠を記載した「チェックコメント」を作成してください。

- チェックコメントの記載方式
  ①「解答ファイル」の該当箇所に Word コメント機能「吹き出し」で書く
  例：



  ②「解答ファイル」ではなく別途「チェックコメント」ファイルを作成しそちらに書く

  例：

受験番号：
氏名：
科目：機械工学

チェックコメント

問２
段落【００２７】
和訳の１行目「挿通孔１４、３４」
原文は「insertion hole 14, 24」ですので、「挿通孔１４、２４」の誤りだと思います。

問２
段落【００２７】
和訳の８行目
原文の「more effectively than the tubular member passing thorough the insertion hole」が訳抜けしています。「ウイルス飛沫の侵入経路を遮断し」の直前に「チューブ状部材が挿通孔を通るよりも効果的に」と入れるべきだと思います。

①②のどちらでも結構です。②の場合はファイル名を「チェックコメント（受験番号）」とし、対象箇所が分かるよう行や段落を明記してください。

５．全体の解答字数に特に制限はありません。適切な箇所で改行してください。

６．課題文に段落番号がある場合、これを訳文に記載してください。

７．設問は複数あります。それぞれの設問の指示に従い、すべて解答してください。

問１．以下は、“Radiation curable compositions for additive manufacturing of parts with high impact resistance, high ductility and high heat resistance” (WO 2023025625)という明細書の従来技術の部分です。以下の箇所をチェックして下さい。

***** チェック START *****

This invention relates to liquid radiation curable compositions suitable for additive manufacturing processes to obtain high impact resistant, high ductility and high heat resistant three-dimensional objects.

Additive manufacturing (AM) technology through a photopolymerization process in which layer-by-layer solidification of liquid resinous materials by means of radiation curing (e.g. UV) to manufacture three-dimensional solid polymeric objects has tremendous potential for direct manufacturing of end-use parts.

Traditional Stereolithography (SLA) materials or Digital Light Processing (DLP) materials are known for their rigid but also brittle properties which are typically associated with low impact strength. Such materials are suitable for prototyping applications only.

Materials with high ductility, high impact resistance and high heat resistance are generally desired for additive manufacturing of end-use functional parts. Currently, commercially available single cure radiation curable liquid resins for SLA/DLP printing technology, are not able to achieve these properties altogether.

The elongation at break measures the material’s ductility and indicates the ability to undergo certain deformation before material failure. A material with high ductility will be able to deform and not break under a tensile load. On the other hand, material with low ductility indicates brittleness, and the fracture will occur before the material is deformed under a tensile load. Materials with elongation at break, i.e. > 20% typically have good ductility. To complement the elongation at break, impact resistant properties also need to be measured as ductile materials may behave similar to brittle materials under high-energy impact conditions. Therefore, it is essential for ductile materials to also exhibit high impact resistant properties.

Materials with good ductility and/or high impact resistance are usually less crosslinked materials with more soft segments in the backbone of the polymer network. More soft segments, however, result in low heat deflection temperature (HDT). High crosslinked

materials on the other hand are associated with high heat deflection temperature (HDT) but low impact resistance and low ductility.

***** チェック END *****

問２．以下は、“ADHESIVE BONDING FOR BIFACIAL AND TANDEM SOLAR CELLS” (US 2025/0204140 A1)という米国特許出願の DETAILED DESCRIPTION の部分です。以下の箇所を和訳して下さい。

***** 翻訳 START *****

[0042] Disclosed herein are bifacial perovskite solar cells, transparent perovskite solar cells in a 4-terminal tandem solar cell configuration, and perovskite solar cells with silicon or copper-indium-gallium-selenide (CIGS) solar cells in a 2-terminal tandem solar cell configuration, and methods of making the same.

[0043] Perovskite solar cells are an emerging solar cell technology offering high light conversion efficiencies at low fabrication and energy costs. The active perovskite layer as well as organic charge transport layers are fabricated below 150° C. Higher temperatures will lead to degradation of those layers.

[0044] A solar cell can include a first transparent conductive oxide (TCO) layer proximate to a first charge transport layer; a second TCO layer proximate to a second charge transport layer; a perovskite layer disposed between first and second charge transport layers; and (a) a first plurality of electrically conductive lines disposed between the first TCO layer and the first charge transport layer; or (b) a second plurality of electrically conductive lines disposed between the second TCO layer and second charge transport layer; or (c) both (a) and (b). The cell can include an adhesive layer between the first transparent conductive oxide (TCO) layer and the perovskite layer.

[0045] A perovskite material can have formula (Ia):

formula (Ib)

$$APbX_3 \qquad \text{(Ia)}$$

or

$$ASnX_3 \qquad \text{(Ib)}$$

[0046] where A is an organic or molecular cation (such as ammonium, methylammonium, formamidinium, phosphonium, cesium, etc.), and X is a halide ion (such as I, Br, or Cl).

[0047] Alternatively, a perovskite material can have the formula (II):

$$A_x A'_{1-x} B_y B'_{1-y} O_{3\pm\delta} \qquad \text{(II)}$$

[0048] where each of A and A′, independently, is a rare earth, alkaline earth metal, or alkali metal, x is in the range of 0 to 1, each of B and B′, independently, is a transition metal, y is in the range of 0 to 1, and δ is in the range of 0 to 1. δ can represent the average number of oxygen-site vacancies (i.e., −δ) or surpluses (i.e., +δ); in some cases, δ is in the range of 0 to 0.5, 0 to 0.25, 0 to 0.15, 0 to 0.1, or 0 to 0.05. For clarity, it is noted that in formula (I), B and B′ do not represent the element boron, but instead are symbols that each independently represent a transition metal. In some cases, δ can be approximately zero, i.e., the number of oxygen-site vacancies or surpluses is effectively zero. The material can in some cases have the formula AByB′1-yO3 (i.e., when x is 1 and δ is 0); AxA′1-xBO3 (i.e., when y is 1 and δ is 0); or ABO3 (i.e., when x is 1, y is 1 and δ is 0). The perovskite can form a two dimensional layer (2D-perovskite) or a three dimensional layer (3D-perovskite).

***** 翻訳 END *****

問３．以下は、”ZINC ALKALINE SECONDARY BATTERY INCLUDING ANCHORED ELECTROLYTE ADDITIVES” (WO 2020060985）という明細書の実施例です。必要に応じて、特許請求の範囲、明細書段落［００１４］、及び図面との対応関係を参照しながら、翻訳して下さい。

***** 翻訳 START *****

Tests performed with nickel-zinc (Ni-Zn) small cells demonstrate the effectiveness of combining electrode and electrolyte additives to enhance cycle life.

Cells were fabricated with and without electrolyte and zinc electrode additives designed to enhance cycle life by reducing zinc solubility and mobility. Both the standard and modified zinc negative electrodes were fabricated with nucleation additives, hydrogen suppression additives, and binder additives. The modified zinc electrode contained an additional tin oxide additive to evaluate cycle life of cells with multivalent oxide additives. The standard electrolyte was a solution composed primarily of potassium hydroxide with lithium hydroxide, and zinc oxide. Zinc acetate and sodium hexametaphosphate additives that mitigate zinc migration and solubility were added to the modified electrolyte.

Results from cycling tests at 100% depth of discharge reveal that cycle life can be increased with these additives.

Cycle utilization as a function of cycle number is shown in Figure 2. Utilization dropped to 95% after 47 cycles for the test cell with the standard electrolyte and electrode that do not contain additives that suppress zinc solubility and migration. A similar decrease in utilization was observed after 105 cycles for the cell with the modified electrode containing tin oxide and after 142 cycles for die cell with the modified electrolyte containing sodium hexametaphosphate and zinc acetate. The most significant increase in cycle life was exhibited by the cell in which the electrode contained tin oxide and the electrolyte contained sodium hexametaphosphate and zinc acetate additives. This cell with the modified electrolyte and electrode reached 169 cycles before utilization decreased to 95%. The enhancement in cycle number at 95% utilization, with respect to the cell with the standard electrolyte and zinc electrode, corresponds to an increase in cycle life of ~120% for the cell with the modified zinc electrode, ~202% for the cell with the modified electrolyte, and ~260% for the cell with the modified electrolyte and zinc electrode.

Taken together, these results confirm that hexametaphosphate and zinc acetate electrolyte additives combined with a zinc electrode containing multi-valent oxides unexpectedly improve Ni-Zn cell life performance under excessive cycling conditions.

***** 翻訳 END *****

1. A zinc alkaline secondary battery comprising:

a positive electrode;

a negative electrode including a multi-valent oxide species;

a separator system disposed between the electrodes; and

an alkaline electrolyte in contact with the negative electrode and including hexametaphosphate salt and zinc acetate, ligands from the hexametaphosphate salt and zinc acetate being anchored to the negative electrode via chelation sites created by the multi-valent oxide species.

2. The zinc alkaline secondary battery of claim 1, wherein a concentration of the hexametaphosphate salt is less than 0.004 molar.

3. The zinc alkaline secondary battery of claim 1, wherein a concentration of the zinc acetate is less than 0.4 molar.

4. The zinc alkaline secondary battery of claim 1, wherein the multi-valent oxide species includes bismuth, indium, tin, titanium, or a combination thereof.

5. The zinc alkaline secondary battery of claim 1, wherein the multi-valent oxide species are 2% to 25% by dry active mass of the negative electrode.

6. The zinc alkaline secondary battery of claim 1, wherein the alkaline electrolyte further includes hydroxide.

7. The zinc alkaline secondary battery of claim 6, wherein the hydroxide is potassium hydroxide, cesium hydroxide, indium hydroxide, lithium hydroxide, ruthenium hydroxide, or sodium hydroxide.

8. The zinc alkaline secondary battery of claim 1, wherein the alkaline electrolyte includes borate.

9. The zinc alkaline secondary battery of claim 1, wherein the alkaline electrolyte includes zinc oxide.

10. The zinc alkaline secondary battery of claim 1, wherein the alkaline electrolyte includes a dispersant.

11. The zinc alkaline secondary battery of claim 1, wherein the negative electrode includes a borate salt, calcium hydroxide, calcium oxide, calcium zincate, strontium hydroxide, strontium oxide, strontium zincate, zinc oxide, or a combination thereof.

12. The zinc alkaline secondary battery of claim 1, wherein the positive electrode is a manganese dioxide, nickel hydroxide, oxygen, or silver electrode.

[0014] In certain arrangements, the alkaline electrolyte 28 may also include borate salt, hydroxide (e.g., potassium hydroxide, cesium hydroxide, indium hydroxide, lithium hydroxide, ruthenium hydroxide, or sodium hydroxide), zinc oxide, and/or a dispersant.

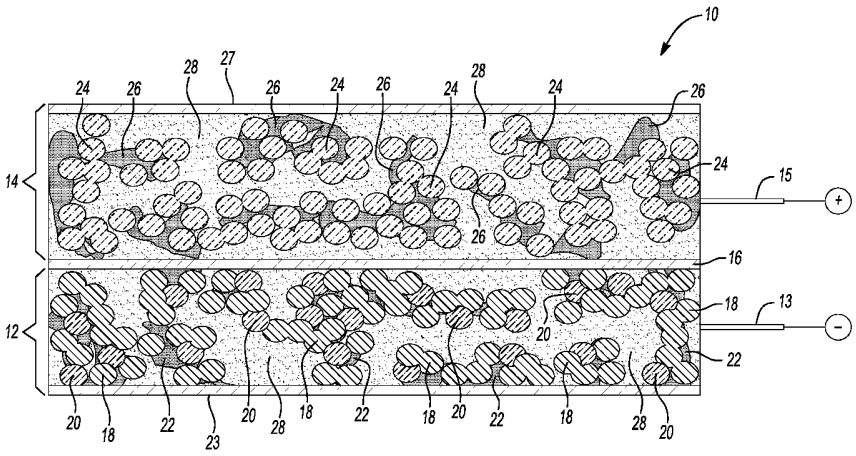


Fig-1

WO 2020/060985
PCT/US2019/051428

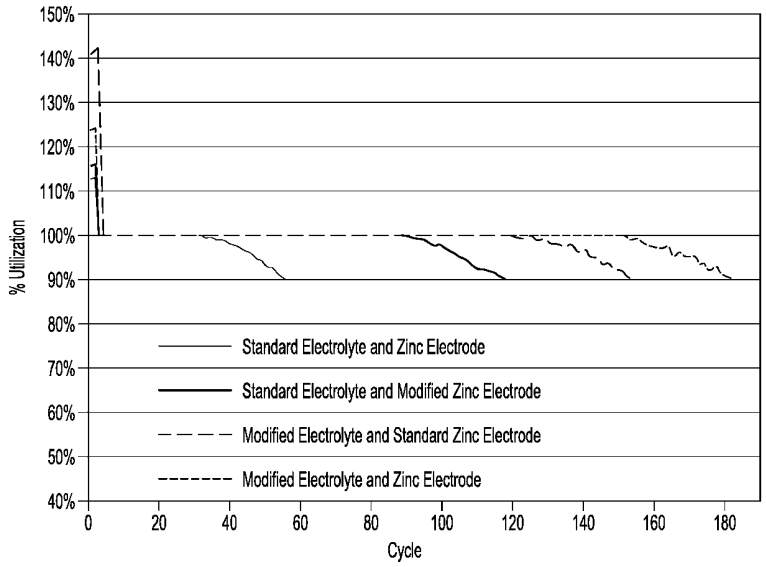

150%
140%
130%
120%
110%
100%
90%
80%
70%
60%
50%
40%
% Utilization
0
20
40
60
80
100
120
140
160
180
Cycle
Standard Electrolyte and Zinc Electrode
Standard Electrolyte and Modified Zinc Electrode
Modified Electrolyte and Standard Zinc Electrode
Modified Electrolyte and Zinc Electrode

Fig-2

問４．以下は、“FORMATION OF METAL-ORGANIC FRAMEWORKS” (US 2021/0230191 A1)という米国特許出願の CLAIMS の部分です。以下の箇所を和訳して下さい。

***** 翻訳 START *****

Claims

1. A method of forming metal-organic frameworks, said method comprising:

exposing a plurality of zero-oxidation state metal atoms to an oxidizing agent,

wherein the exposing facilitates oxidation of the plurality of zero-oxidation state metal atoms to a plurality of metallic ions,

wherein the plurality of metallic ions react with a plurality of ligands to form the metal-organic frameworks, and

wherein the formed metal-organic frameworks comprise one or more metals and one or more ligands coordinated with the one or more metals.

2. (canceled)

3. The method of claim 1,

wherein the plurality of ligands are selected from the group consisting of organic ligands, amino acids, dipeptide linkers, glycine-serine dipeptide linkers, beta-alanine and L-histidine dipeptide linkers, 4,4′-bipyridine linkers, polydentate linkers, bidentate linkers, tridentate linkers, imidazole linkers, hexatopic ligands, polydentate functional groups, aromatic ligands, triphenylene-based ligands, triphenylene derivatives, hexahydroxytriphenylene-based organic linkers, hexaiminotriphenlyene-based organic linkers, tridentate ligands, thiol-containing ligands, tridentate thiol-containing ligand, bis(dithiolene), 2,3,6,7,10,11-hexahydroxytriphenylene (HHTP), 2,3,6,7,10,11-hexaaminotriphenylene (HITP), trimesic acid (1,3,5-benzenetricarboxylic acid, BTC), aspartic acid, 2,3,6,7,10,11-hexathiotriphenylene (HTTP), terephthalic acid (1,4-benzodicarboxylic acid), 4,4′-biphenyldicarboxylate (BPDC), p-terphenyl-4,4′-dicarboxylate, 1,3,5-tris(3′,5′-dicarboxy[1,1′-biphenyl]-4-yl)benzene, dppd(1,3-di(4-pyridyl)propane-1,3-dionato), 1,3,5-Tris(4-carboxyphenyl)benzene (BTB), or combinations thereof;

wherein the plurality of metallic ions are selected from the group consisting of Co^{2+}, Ni^{2+}, Cu^{2+}, Cu^{+}, Ag^{+}, Fe^{2+}, Zn^{2+}, Zr^{+}, Zr^{2+}, Sc^{+}, or combinations thereof;

wherein the plurality of zero-oxidation state metal atoms are selected from the group consisting of copper, cobalt, nickel, zinc, silver, iron, zirconium, scandium, a metal, a metalloid, a transition metal, a post-transition metal, a lanthanide, or combinations thereof;

wherein the oxidizing agent is selected from the group consisting of an oxygen-containing compound, O_2, H_2O_2, a halogen, atmospheric oxygen, or combinations thereof; and

wherein the metal-organic frameworks are two-dimensional or three-dimensional.

4. (canceled)

5. The method of claim 1, wherein the metal-organic frameworks are selected from the group consisting of Co_3HTTP_2, Ni_3HTTP_2, Cu_3HTTP_2, Co_3HHTP_2, Ni_3HHTP_2, Cu_3HHTP_2, Co_3HITP_2, Ni_3HITP_2, Cu_3HITP_2, CuBTC, or combinations thereof.

***** 翻訳 END *****