

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MOSES LAKE INDUSTRIES, INC.
Petitioner

v.

ENTHONE, INC.
Patent Owner

Case IPR2014-00246
Patent 7,815,786 B2

Before KEVIN F. TURNER, SHERIDAN K. SNEDDEN, and
JEREMY M. PLENZLER, *Administrative Patent Judges*.

TURNER, *Administrative Patent Judge*

DECISION
Denial of Institution of *Inter Partes* Review
37 C.F.R. § 42.108

I. INTRODUCTION

Moses Lake Industries, Inc. (hereinafter, “MLI”) filed a petition (Paper 1, “Pet.”) requesting *inter partes* review of claims 1-19 of U.S. Patent No. 7,815,786 B2 (“the ’786 Patent”). Patent Owner, Enthone, Inc. (“Enthone”), filed a Preliminary Response (Paper 5, “Prelim. Resp.”). We have jurisdiction under 35 U.S.C. § 314.

The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), which provides:

THRESHOLD.—The Director may not authorize an *inter partes* review to be instituted unless the Director determines that the information presented in the petition filed under section 311 and any response filed under section 313 shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.

We conclude that the information presented in the petition does not demonstrate that there is a reasonable likelihood that MLI will prevail in challenging claims 1-19 as unpatentable under 35 U.S.C. §§ 102 or 103. For the reasons that follow, the Petition is *denied*.

A. *Related Matters*

MLI indicates that the '786 Patent was asserted in *Enthone, Inc. v. Moses Lake Industries, Inc.*, Case No. 1:13-cv-1054, in the U.S. District Court for the Northern District of New York. Pet. 1. U.S. Patent No. 7,303,992 B2, which issued from a parent application of the patent application that issued as the '786 Patent, was also asserted in that civil action. U.S. Patent No. 7,303,992 is also the subject of a petition requesting *inter partes* review in Case IPR2014-00243, which is being decided concurrently.

B. *The '786 Patent (Ex. 1001)*

The '786 Patent relates to a method for electrolytically plating copper onto a substrate having submicron-sized interconnect features, using a source of copper ions and suppressor compound having polyether groups. Ex. 1001, Abstract. The '786 Patent discusses known systems that rely on so-called "superfilling" or "bottom-up growth" to deposit copper into high aspect ratio features, where the superfilling involves filling a feature from the bottom up, rather than at an equal rate on all its surfaces, to avoid seams and pinching off that can result in voiding. *Id.* at 2:16-21. The '786 Patent discloses a suppressor compound formed from a combination of propylene oxide (PO) repeat units and ethylene oxide (EO) repeat units present in a PO:EO ratio between about 1:9 and about 9:1 and bonded to a nitrogen-containing species, wherein the molecular weight of the suppressor compound is between about 1000 and about 30,000. *Id.* at 3:33-38.

C. *Challenged Claims*

Independent claim 1, as well as dependent claims 2-19, are challenged by MLI in its Petition. Claim 1 is illustrative and is reproduced below, with emphasis added:

1. An electrolytic plating composition for electrolytically plating Cu onto a semiconductor integrated circuit substrate having a planar plating surface and submicron-sized interconnect features by immersion of the semiconductor integrated circuit substrate into the electrolytic solution, the composition comprising:

a source of Cu ions in an amount sufficient to electrolytically deposit Cu onto the substrate and into the electrical interconnect features; and

a suppressor comprising a compound selected from the group consisting of:

(i) a first suppressor compound comprising a polyether group bonded to a nitrogen-containing species, *wherein the polyether group comprises a combination of propylene oxide (PO) repeat units and ethylene oxide (EO) repeat units present in a PO:EO ratio between about 1:9 and about 9:1, and wherein the molecular weight of the first suppressor compound is between about 1000 and about 3600 g/mol;*

(ii) a second suppressor compound comprising a polyether group bonded to a nitrogen-containing species, wherein the polyether group comprises a combination of propylene oxide (PO) repeat units and ethylene oxide (EO) repeat units present in a PO:EO ratio between about 1:9 and about 9:1, wherein the molecular weight of the second suppressor compound is between about 1000 and about 30,000 g/mol, and wherein the second suppressor compound further comprises a capping moiety selected from the group consisting of an alkyl group or a block polymer comprising propylene oxide repeat units;

(iii) a third suppressor compound comprising a polyether group bonded to a nitrogen-containing species, wherein the polyether group comprises a combination of propylene oxide (PO) repeat units and ethylene oxide (EO) repeat units present in a PO:EO ratio between about 1:9 and about 9:1, wherein the nitrogen-containing species is an alkylether amine, and wherein the molecular weight of the third suppressor compound is between about 1000 and about 30,000 g/mol; and

(iv) a fourth suppressor compound comprising a polyether group bonded to a nitrogen-containing species, wherein the polyether group comprises a combination of propylene oxide (PO) repeat units and ethylene oxide (EO) repeat units present in a PO:EO ratio between about 1:9 and about 9:1, wherein the molecular weight of the fourth suppressor compound is between about 1000 and about 30,000 g/mol, and wherein a nitrogen in the nitrogen-containing species is a quaternary amine;

(v) a fifth suppressor compound comprising a polyether group bonded to a nitrogen-containing species, wherein the polyether group comprises a combination of propylene oxide (PO) repeat units and ethylene oxide (EO) repeat units present in a PO:EO ratio between about 1:9 and about 9:1, wherein the molecular weight of the fifth suppressor compound is between about 1000 and about 30,000 g/mol, and wherein the composition comprises less than about 30 g/L acid when the fifth suppressor is selected;

(vi) a sixth suppressor compound comprising a polyether group bonded to a nitrogen-containing species, wherein the polyether group comprises a combination of propylene oxide (PO) repeat units and ethylene oxide (EO) repeat units present in a PO:EO ratio between about 1:9 and about 9:1, wherein the molecular weight of the sixth suppressor compound is between about 1000 and about 30,000 g/mol, and wherein the composition comprises between about 4 g/L and about 30 g/L copper ion when the sixth suppressor is selected; and

(vi) combinations thereof.

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