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Roberts
Declaration

PM95012

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

James E. NULTY et al.

Serial No.: 08/577,751 Group Art Unit: 2812

Filed: December 22, 1995 Examiner: GURLEY

For: METHOD FOR ELIMINATING LATERAL SPACER EROSION ON ENCLOSED CONTACT TOPOGRAPHIES DURING RF SPUTTER CLEANING

Assistant Commissioner for Patents
Washington, D.C. 20231

DECLARATION UNDER 37 C.F.R. 1.131

I, **James E. Nulty**, hereby declare and state that:

1. I am an inventor of the above-identified patent application.

2. I have read and I understand (a) the above-identified patent application, (b) the Declaration Under 37 C.F.R. 1.132 dated July 25, 1998 and the references cited therein, (c) the Office Action dated September 22, 1998, (d) U.S. Patent No. 5,759,867 to Armacost et al. (hereinafter, "Armacost et al."), filed on April 21, 1995, and (e) the attached documentation in non-redacted form.

3. I understand that the above-identified application for patent claims, in one aspect:

a) a method of forming a contact opening in a structure comprising a substrate and a plurality of devices thereon, each of the devices comprising a conductive layer disposed over the substrate and a first insulating layer on the conductive layer, and at least two of the devices being interspaced by a contact region, the method comprising:

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C., 20231, on Feb. 22.

i) forming an etch stop layer over insulating spacers in the contact region, wherein the insulating spacers have a substantially rectangular profile; and subsequently

ii) anisotropically etching the structure having the insulating spacers and the etch stop layer in the contact region with an etchant having a selectivity for the etch stop layer relative to the second insulating layer sufficiently low to retain the substantially rectangular profile of the insulating spacers, the etch stop layer being different from the second insulating layer;

and, in a second aspect,

b) a method for forming a contact opening to a first electrically conductive material formed in and/or on a surface of a substrate, the contact opening being formed in a region adjacent to a second electrically conductive material formed on the substrate, comprising the steps of:

i) forming an electrically insulative spacer adjacent to the second electrically conductive material, the spacer having a substantially rectangular cross-sectional shape in a plane that is substantially perpendicular to the substrate surface;

ii) forming an etch stop layer over the spacer and the first and second electrically conductive regions;

iii) forming a blanket layer over the etch stop layer;

iv) selectively etching the blanket layer to form an opening to a first part of the etch stop layer that is formed over the first electrically conductive region;

v) etching the etch stop layer to remove part of the etch stop layer formed over the first electrically conductive region, under conditions that etch (i) the material of the etch stop layer adjacent to the spacer and (ii) the spacer

is maintained (hereinafter, paragraphs (a)(i)-(b)(v) are collectively referred to as "the presently claimed invention").

4. The attached documentation provides evidence of the conception and reduction to practice of at least one working embodiment of the presently claimed invention prior to April 21, 1995.

5. For example, a structure was made by an embodiment of the presently claimed invention prior to April 21, 1995 (see item 4a, "Construction of the Device," on the first page of the attached documentation).

6. The date on the micrograph of a structure made by an embodiment of the presently claimed invention is prior to April 21, 1995 (see "Method Comparison -- Invention" in the attached documentation).

7. I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

8. Further Declarant saith not.

_____
James E. Nulty

_____
Date

ADF

INVENTION DISCLOSURE FORM Disclosure No. _____

1. INVENTOR(S)

A. Name James E Nulty Empl. No. [redacted] Ext. No. [redacted]
Home Mailing Address 1037 Lenor Wy San Jose CA 95128 Home No [redacted]
Citizenship USA

B. Name Christopher J. Petti Empl. No. [redacted] Ext. No. [redacted]
Home Mailing Address 660 Sierra Ave Mountain View, CA 94041
Citizenship USA

C. Division, Dept. or Subsidiary _____

2. TITLE OF INVENTION Method for Eliminating lateral shoulder erosion on enclosed contact topographies during RF Sputter Cleaning

3. CONCEPTION OF INVENTION

a. Date of first drawing or drawings _____
Where can first drawing be found? _____

b. Date of first written description _____
Where is description found? _____

c. Date of first oral disclosure to others _____
To whom? _____

4. CONSTRUCTION OF DEVICE a.) Date Completed [redacted]

b. Was prototype made? yes

c. By whom made? James Nulty

d. Where can the prototype be found? [redacted] JEM's on JEN Computer [redacted]

5. TEST OF DEVICE a.) Date: _____ b.) Witness(s): _____

c. Results: _____

6. SALE a.) Was invention sold or offered for sale? Yes ____ No ____ b.) Date of first sale _____

Inventor(s) James E Nulty Date [redacted]

[redacted] Date [redacted]

Witness, Read, and Understood by: [redacted]

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INVENTION DISCLOSURE FORM

7. USE a. Is invention presently being used? Yes X No _____.

b. Are there specific plans for its use in near future? yes

8. RELATED PRINTED PUBLICATIONS, PATENTS, PATENT APPLICATIONS. _____

9. WAS INVENTION Conceived (Yes_____ (No X_____ During performance of
Constructed (Yes_____ (No X_____ Government contract?
Tested (Yes_____ (No X_____

a. Contract Number _____
(Give Full Contract Number)

This description of invention should be written in the inventor's own words and generally should follow the outline given below. Sketches, prints, photos, and other illustrations, as well as reports of any nature in which the invention is referred to, if available, should form a part of this disclosure and reference can be made thereto in the description of contruction and operation.

FOR ANSWERS TO THE FOLLOWING QUESTIONS, USE THE ATTACHED SHEET(S).

1. General purpose of invention. State in general terms the objects of the invention.

2. Describe old method(s), if any,of performing the function of the invention.

3. Indicate the disadvantages of the old method(s). What problem(s) is your invention trying to solve?

4. Describe the construction of your invention, showing the changes, additions and improvements over the old method.

5. Give details of the operation if not already described under 4.

6. State the advantages of your invention over what has been done before.

7. Indicate any alternate method of construction.

[redacted]
Inventor Date [redacted]

[redacted]
Witness, Read, and Understood by: Date [redacted]

[redacted] Date [redacted]

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