UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS COMPANY, LTD.
Petitioner

v.

DANIEL L. FLAMM
Patent Owner

U.S. Patent No. 5,711,849

PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 5,711,849

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9.1.1. [1.P] "A device fabrication method comprising the steps of:" 34

9.1.2. [1.1] "providing a plasma etching apparatus comprising a substrate therein, said substrate comprising a top surface and a film overlying said top surface, said film comprising a top film surface;" 35

9.1.3. [1.2] "etching said top film surface to define a relatively non-uniform etching profile on said film, and defining etch rate data comprising an etch rate and a spatial coordinate which defines a position within said relatively non-uniform etching profile on said substrate, said etching comprising a reaction between a gas phase etchant and said film; and" 37

9.1.4. [1.3] "extracting a surface reaction rate constant from said etch rate data, and using said surface reaction rate constant in the fabrication of a device." 41

9.2. Claim 10 is obvious over Alkire in view of Kao 46

9.2.1. [10.P] "A method of designing a reactor comprising the steps of:" 46

9.2.2. [10.1] "providing a first plasma etching apparatus comprising a substrate therein, said substrate comprising a top surface and a film overlying said top surface, said film comprising a top film surface".....47

9.2.3. [10.2] "etching said top film surface to define a relatively non-uniform etching profile on said film, and defining etch rate data comprising an etch rate and a spatial coordinate which defines a position within said relatively non-uniform etching profile on said film of said substrate, said etching comprising a reaction between a gas phase etchant and said film; and".....47

9.2.4. [10.3] "extracting a surface reaction rate constant from said etch rate data, and using said surface reaction rate constant in designing a second plasma etching apparatus."....48

9.3. Claim 20 is obvious over Alkire in view of Kao 49

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9.3.1. [20.p] "A substrate fabrication method, using a plasma etching apparatus, said method comprising:" 49

9.3.2. [20.1] "providing a substrate selected from a group consisting of a semiconductor wafer, a plate, and a flat panel display, said substrate comprising a top surface;" 49

9.3.3. [20.2] "forming a film overlying said top surface, said film comprising a top film surface;" 50

9.3.4. [20.3] "etching said top film surface to define a relatively non-uniform profile on said film, and defining etch rate data comprising an etch rate and a spatial coordinate which defines a position within said relatively non-uniform etching profile of said film on said substrate, said etching comprising a reaction between a gas phase etchant and said film; and" 50

9.3.5. [20.4] "extracting a surface reaction rate constant from said etch rate data, and using said surface reaction rate constant." 51

9.4. Claim 22 is obvious over Alkire in view of Kao 51

9.4.1. [22.P] "A method of fabricating an integrated circuit device, using a plasma etching apparatus, said method comprising:" 51

9.4.2. [22.1] "providing a uniformity value and a surface reaction rate constant for an etching reaction, said etching reaction including a substrate and etchant species;" 52

9.4.3. [22.2]"defining etching parameters providing said uniformity value; and"

9.4.4. [22.3] "adjusting at least one of said etching parameters using said surface reaction rate constant to produce a selected etching rate" 55

9.4.5. [22.4] "wherein said etching rate providing an etching condition for fabrication of an integrated circuit device." 57

9.5. Claim 26 is obvious over Alkire in view of Kao 58

9.5.1. [26.P] "A process for fabricating a device using a plasma etching apparatus, said device being fabricated

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by use of a surface reaction rate constant, said surface reaction rate constant being derived from a method comprising:”.....58

9.5.2. [26.1] “providing a plasma etching apparatus comprising a substrate therein, said substrate comprising a top surface and a film overlying said top surface, said film comprising a top film surface”.....58

9.5.3. [26.2] “etching said top surface at a temperature to define a relatively non-uniform etching profile on said film, and defining etch rate data comprising an etch rate and a spatial coordinate which defined a position from said relatively non-uniform etching profile on said film of said substrate, said etching comprising a reaction between a gas phase etchant and said film; and”.....59

9.5.4. [26.3] “extracting from said etching rate data a surface reaction rate constant for said temperature.” 59

9.6. Dependent Claims 2 and 11 are obvious over Alkire in view of Kao 60

9.6.1. [2.0] “The method of claim 1 wherein said etching step is diffusion limited.” 60

[11.0] “The method of claim 10 wherein said etching step at a postion [sic] on said relatively non-uniform etching profile is diffusion limited.”.....60

9.7. Dependent Claims 3 and 12 are obvious over Alkire in view of Kao 60

9.7.1. [3.0] “The method of claim 1 wherein said spatial coordinate includes a radius and an angle.”.....61

[12.0] “The method of claim 10 wherein said spatial coordinate which defines said position along said relatively non-uniform etching profile includes a radius and an angle.”.....61

9.8. Dependent Claims 4 and 13 are obvious over Alkire in view of Kao 63

9.8.1. [4.0] “The method of claim 1 wherein said spatial coordinate includes an x-direction and a y-direction.”.....63

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