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(54) **METHOD FOR CONTROLLING POLISHING WAFER**

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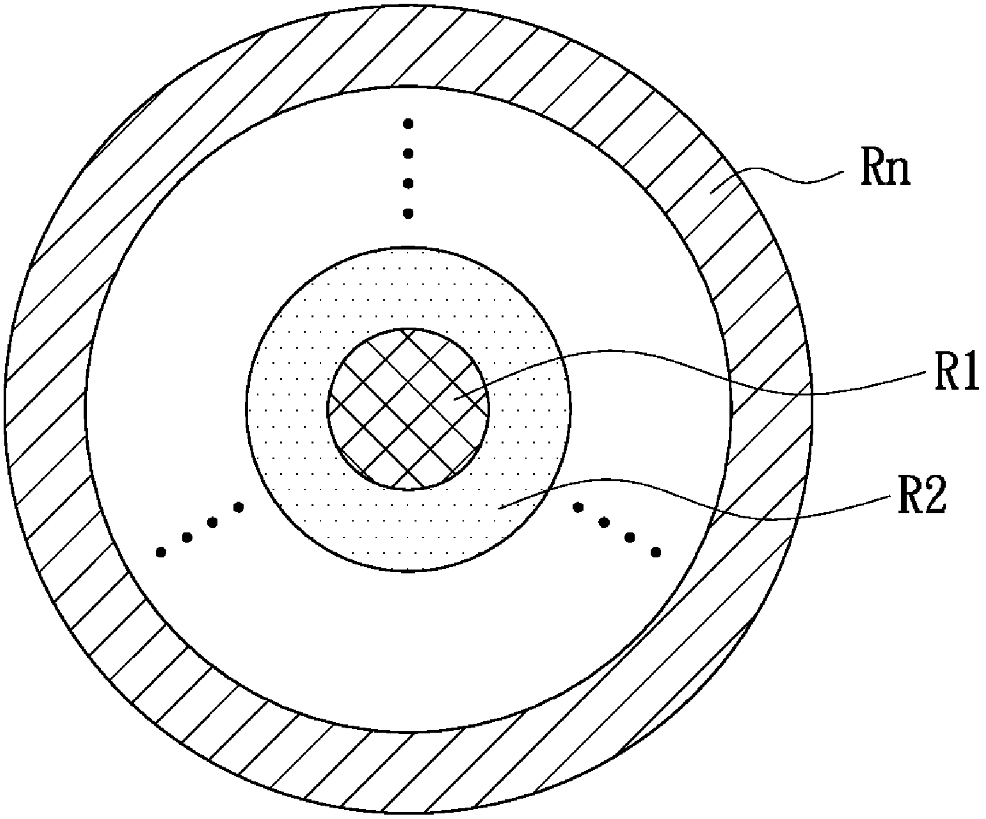
(57) **ABSTRACT**

A method for controlling polishing a wafer includes the following step. Firstly, a database storing a number of status data of a polished film of a wafer and a number of polishing parameters corresponding to the status data is established. Each of the polishing parameters includes a head sweep of a polishing head along a redial direction of a polishing platen. The head sweep refers to a movement distance range from a center of the polishing head to a center of the polishing platen during a polishing process. Subsequently, a first wafer having a predetermined status data is provided. Thereafter, the predetermined status data is compared with the status data in the database so as to find out the polishing parameter corresponding to the predetermined status data, thereby determining a first polishing parameter of the first wafer. Afterward, a first polishing process using the first polishing parameter is applied to the first wafer. The method can control the status of a polished film and optimize the polishing parameter.



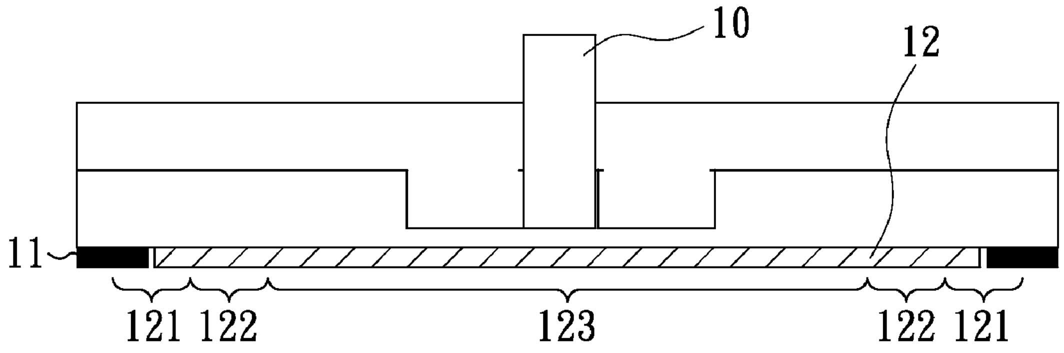


FIG. 1(Prior Art)

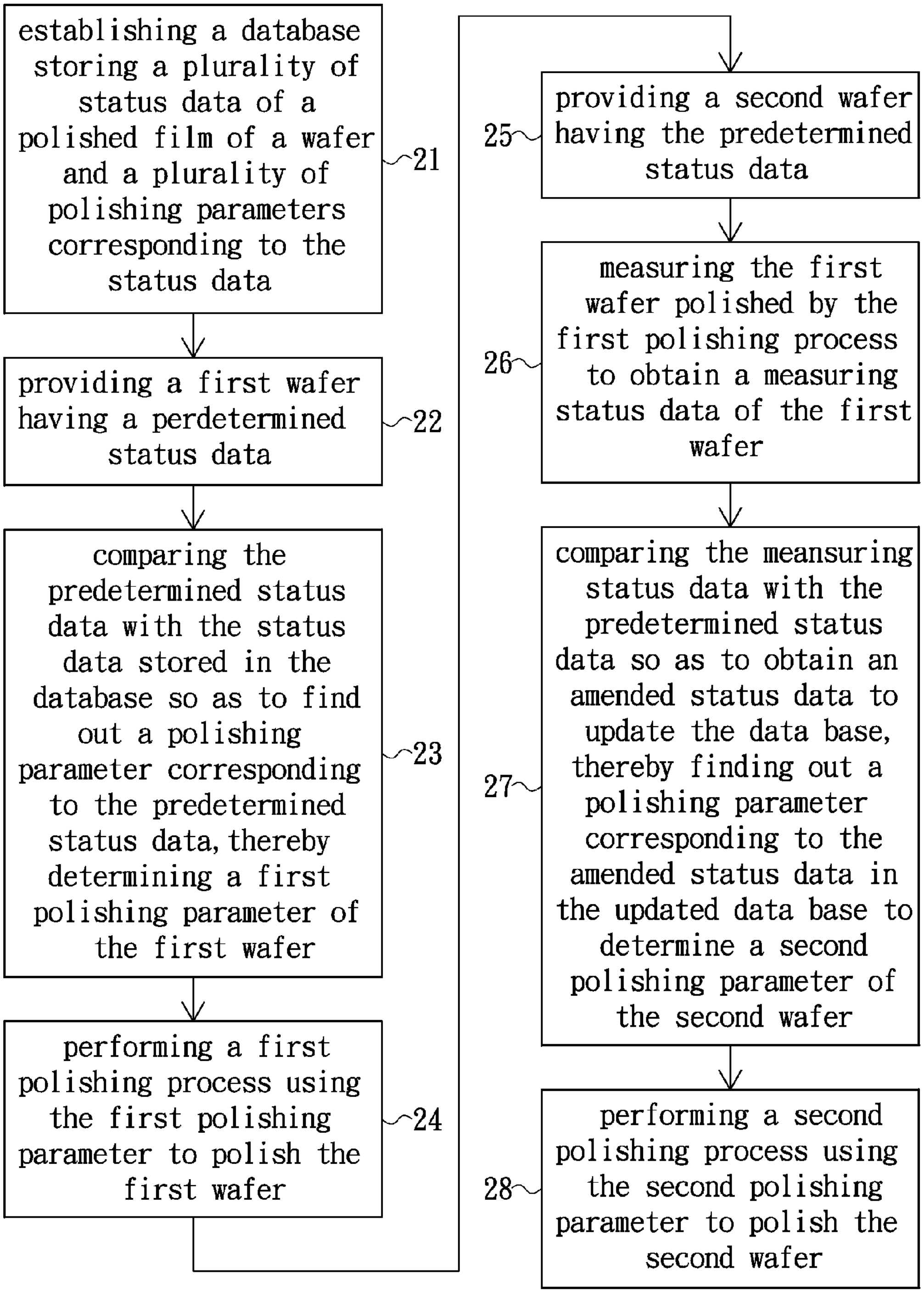

establishing a database storing a plurality of status data of a polished film of a wafer and a plurality of polishing parameters corresponding to the status data
21
providing a first wafer having a perdetermined status data
22
comparing the predetermined status data with the status data stored in the database so as to find out a polishing parameter corresponding to the predetermined status data, thereby determining a first polishing parameter of the first wafer
23
performing a first polishing process using the first polishing parameter to polish the first wafer
24
providing a second wafer having the predetermined status data
25
measuring the first wafer polished by the first polishing process to obtain a measuring status data of the first wafer
26
comparing the meansuring status data with the predetermined status data so as to obtain an amended status data to update the data base, thereby finding out a polishing parameter corresponding to the amended status data in the updated data base to determine a second polishing parameter of the second wafer
27
performing a second polishing process using the second polishing parameter to polish the second wafer
28

FIG. 2

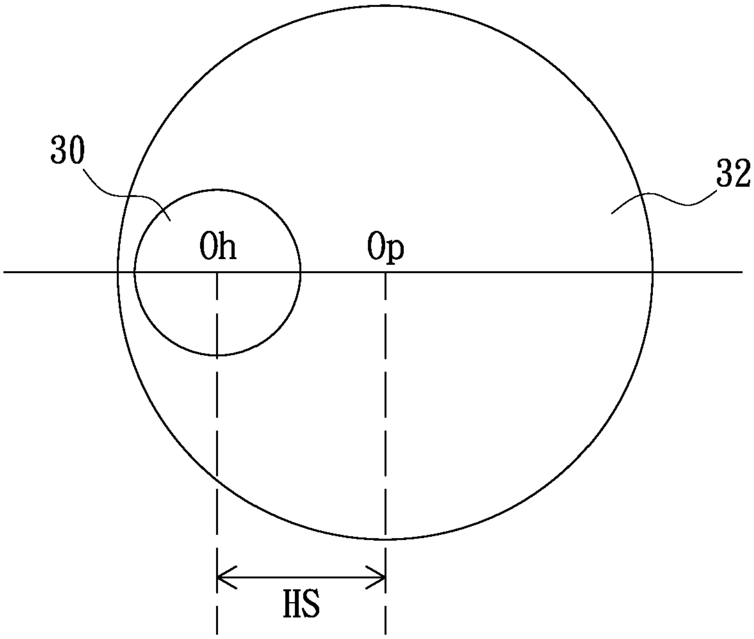


FIG. 3

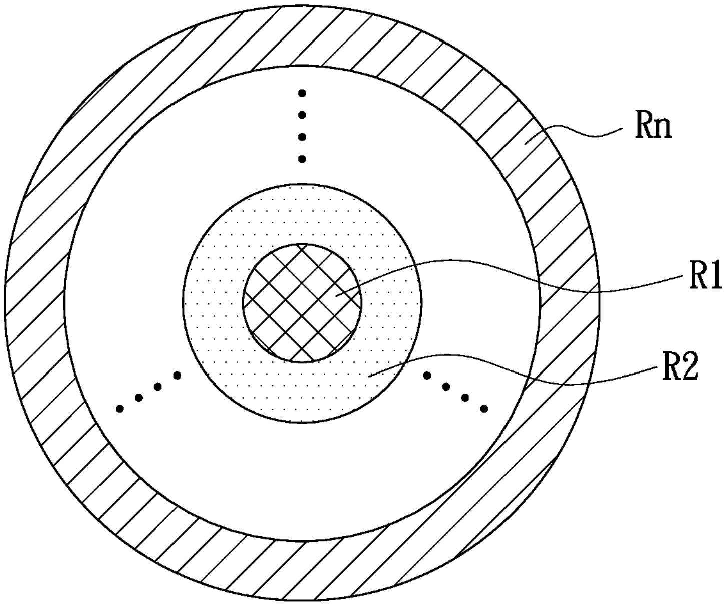
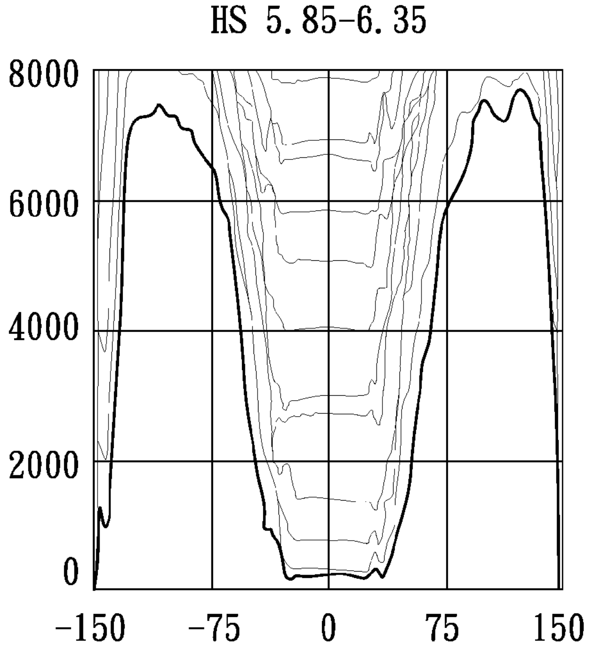


FIG. 4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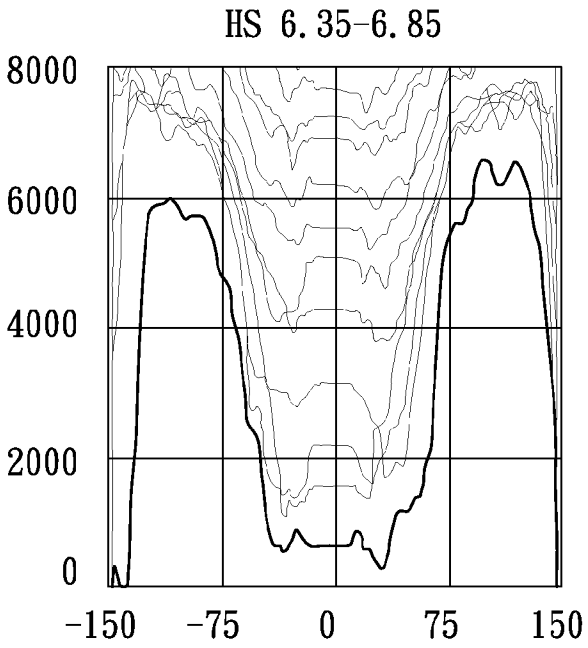
4000
2000
0
-150
-75
0
75
150

FIG. 5A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6000
4000
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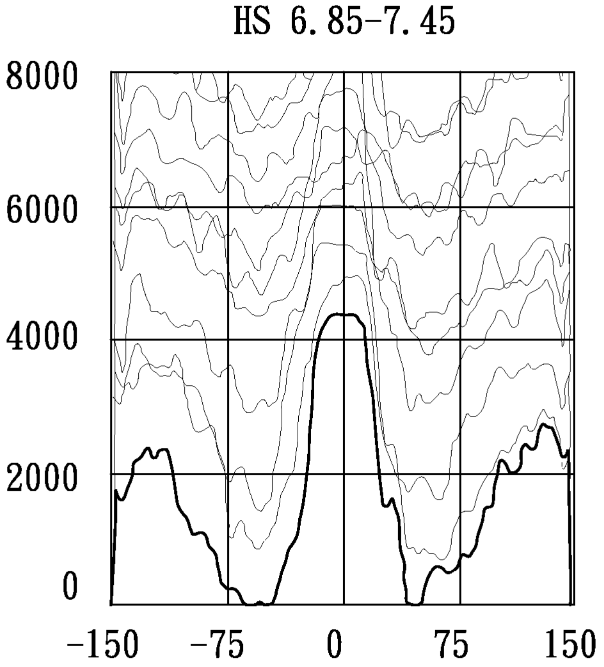
-150
-75
0
75
150

FIG. 5B


HS 6.85-7.45
8000
6000
4000
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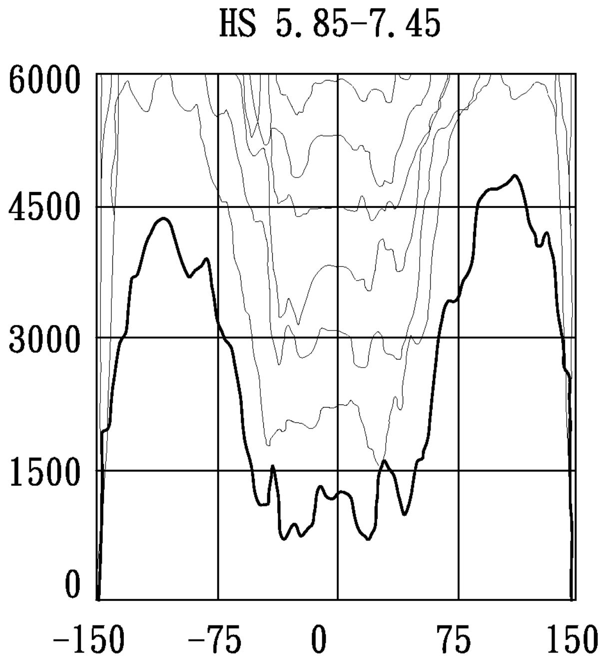
0
-150
-75
0
75
150

FIG. 5C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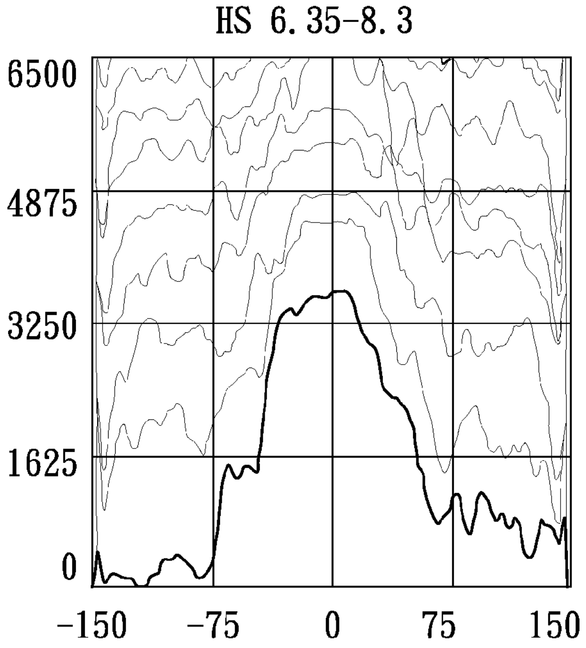
6000
4500
3000
1500
0
-150
-75
0
75
150

FIG. 5D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6500
4875
3250
1625
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-150
-75
0
75
150

FIG. 5E

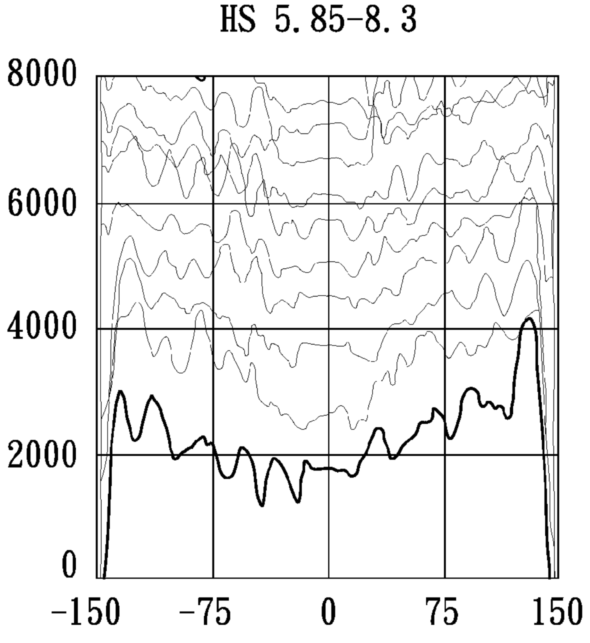
HS 5.85-8.3
8000
6000
4000
2000
0
-150
-75
0
75
150

FIG. 5F

METHOD FOR CONTROLLING POLISHING WAFER

BACKGROUND

[0001] The present invention relates to a polishing process of a wafer, and particularly to a method for controlling polishing a wafer.

[0002] With the development of semiconductor technology, it gradually becomes a trend to fabricate high density circuits on a wafer. Thus, it is necessary for the wafer to have a metal film (e.g., a copper film) with a thin thickness and a high uniformity.

[0003] Generally, the metal film on the wafer is polished by a chemical mechanical polishing (CMP) process. FIG. **1** is a schematic view of polishing a semiconductor wafer using a chemical mechanical polishing process. Referring to FIG. **1**, a polishing head **10** is used to hold a wafer **12** and to apply pressure to the wafer **12** so that the wafer **12** is contacted with a polishing pad of a polishing platen (not shown) to be polished. The polishing head **10** includes a retaining ring **11** for controlling pressure. The polishing head **10** can control a polishing speed of the wafer **12** by applying different pressures to the wafer **12**, thereby controlling a thickness distribution of a polished metal film on the wafer **12**. In general, the higher the pressure applied by the polishing head **10** to the wafer **12** is, the faster the polishing speed of the wafer **12** is and the thinner the thickness of the polished metal film on the wafer **12** is. However, nowadays, although the thin polished metal film can be obtained using the conventional chemical mechanical polishing process, the conventional chemical mechanical polishing process can not satisfy a thickness uniformity demand of polishing the metal film of the wafer **12**.

[0004] In detail, during polishing the wafer **12** using the chemical mechanical polishing process, a polished region includes a number of annular regions, for example, a first region **121**, a second region **122** and a third region **123**. Because the third region **123** has a large area, in fact, it is difficult to control the thickness uniformity of the polished metal film in the third region **123** only using the polishing pressure. In addition, the pressure applied to the first region **121**, the pressure applied to the second region **122** and the pressure applied to the third region **123** by the polishing head **10** can only be either increased or decreased simultaneously. Thus, the polishing speed in the first region **121**, the polishing speed in the second region **122** and the polishing speed in the third region **123** also can only be either increased or decreased simultaneously correspondingly. That is, the polishing head **10** can not adjust the polishing pressure according to different regions. Therefore, when the metal film of the wafer is polished by a polishing process and is expected to have a special thickness distribution for fabricating circuits, the above-mentioned method for controlling polishing the wafer is not satisfying.

BRIEF SUMMARY

[0005] The present invention provides a method for controlling polishing a wafer so as to control a status of a polished film and optimize a polishing parameter.

[0006] To achieve the above-mentioned advantages, the present invention provides a method for controlling polishing a wafer including the following step. Firstly, a database storing a number of status data of a polished film of a wafer and a number of polishing parameters corresponding to the status data is established. Each of the polishing parameters includes a head sweep of a polishing head along a redial direction of a polishing platen. The head sweep refers to a movement distance range from a center of the polishing head to a center of the polishing platen during a polishing process. Subsequently, a first wafer having a predetermined status data is provided. Thereafter, the predetermined status data is compared with the status data in the database so as to find out a polishing parameter corresponding to the predetermined status data, thereby determining a first polishing parameter of the first wafer. Afterward, a first polishing process using the first polishing parameter is performed to polish the first wafer.

[0007] In one embodiment provided by the present invention, the first polishing parameter includes a first head sweep, and the polishing head moves back and forth in the first head sweep along the redial direction of the polishing platen during the first polishing process. In one embodiment provided by the present invention, the polished film is a copper film. In one embodiment provided by the present invention, each of the status data is a thickness distribution of the polished film. In one embodiment provided by the present invention, each of the status data is a removal rate distribution of the polished film.

[0008] In one embodiment provided by the present invention, the method for controlling polishing the wafer further includes the following step. A second wafer having the predetermined status data is provided. Subsequently, the first wafer polished by the first polishing process is measured to obtain a measuring status data of the first wafer. Thereafter, the measuring status data is compared with the predetermined status data so as to obtain an amended status data to update the data base. A polishing parameter corresponding to the amended status data is found out in the updated data base, thereby determining a second polishing parameter of the second wafer. Afterward, a second polishing process using the second polishing parameter is performed to polish the second wafer.

[0009] In one embodiment provided by the present invention, in the step of comparing the measuring status data with the predetermined status data, a number of regions are defined on the first wafer so as to obtain a correcting value of each of the regions. The correcting value of each of the regions is equal to a ratio of a status value of the measuring status data in each of the regions to a status value of the predetermined status data in each of the regions. And the amended status data are equal to the status value of the measuring status data in each of the regions is respectively multiplied by the corresponding correcting value.

[0010] In one embodiment provided by the present invention, the second polishing parameter includes a second head sweep, and the polishing head moves back and forth in the second head sweep along the redial direction of the polishing platen during the second polishing process.

[0011] To achieve the above-mentioned advantages, the present invention also provides a method for controlling polishing a wafer including the following steps. At first, a number of wafers having an identical polished film are provided. Subsequently, the polished films of the wafers are polished sequentially using a number of polishing parameters. Each of the polishing parameters includes a head sweep of a polishing head along a redial direction of a polishing platen. The head sweep refers to a movement distance range from a center of the polishing head to a center of the polishing platen during a polishing process. Thereafter, the wafers are measured so as to obtain a number of status data of the polished films, thereby establishing a data base including a relationship of the status data and the polishing parameters corresponding to the status data. Afterward, the database is stored in an advanced process control (APC) system. Then, a polishing process of a wafer is controlled using the advanced process control system.

[0012] In the method for controlling polishing the wafer of the present invention, a database storing a number of status data of the polished film of the wafer and a number of polishing parameters corresponding to the status data is established. The data base is stored in the advanced process control system for controlling the polishing process of the wafer. Because each of the polishing parameters at least includes the head sweep of the polishing head along the redial direction of the polishing platen, the status of the polished film of the wafer, even the status of a partial region of the polished film of the wafer, can be controlled by adjusting the head sweep of the polishing head along the redial direction of the polishing platen. Therefore, the method can optimize the polishing parameter during the polishing process, thereby obtaining the satisfying polished film.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] These and other features and advantages of the various embodiments disclosed herein will be better understood with respect to the following description and drawings, in which like numbers refer to like parts throughout, and in which:

[0014] FIG. **1** is a schematic view of polishing a wafer using a conventional chemical mechanical polishing process.

[0015] FIG. **2** is a flow chart of a method for controlling polishing a wafer in accordance with an embodiment of the present invention.

[0016] FIG. **3** is a schematic view of a polishing device for a polishing process in accordance with an embodiment of the present invention.

[0017] FIG. **4** is a schematic view of a number of polishing regions defined on a wafer in accordance with an embodiment of the present invention.

[0018] FIGS. **5A~5F** are schematic views of a number of status data of a number of wafers in accordance with another embodiment of the present invention, each of which is a thickness distribution of the polished film of the wafer.

DETAILED DESCRIPTION

[0019] FIG. **2** is a flow chart of a method for controlling polishing a wafer in accordance with an embodiment of the present invention. Referring to FIG. **2**, in the present embodiment, the method for controlling polishing a wafer includes the following steps. Firstly, a database storing a number of status data of a polished film of a wafer and a number of polishing parameters corresponding to the status data is established, as described in the step **21**. Each of the polishing parameters at least includes a head sweep of a polishing head along a redial direction of a polishing platen. The head sweep refers to a movement distance range from a center of the polishing head to a center of the polishing platen during a polishing process. In the present embodiment, the polished film is, for example, a copper film.

[0020] In detail, in the step **21**, at first, a number of wafers are provided. The wafers have an identical polished film (e.g., copper film). Then, the polished films of the wafers are polished sequentially using a number of polishing parameters. That is, each of the wafers is polished using a corresponding polishing parameter. Further referring to FIG. **3**, each of the polishing parameters includes a head sweep HS of a polishing head **30** along a redial direction of a polishing platen **32**. It is noted that each of the polishing parameters can includes, for example, a polishing pressure, a polishing time, and so on. As shown in FIG. **3**, the head sweep HS refers to a movement distance range from a center Oh of the polishing head **30** to a center Op of the polishing platen **32** during a polishing process. The movement distance range is determined by the radius of the polishing head **30** and the radius of the polishing platen **32** together. The polishing parameters can be chose in a manner such that the head sweep HS is either increased or decreased by a certain step. In addition, the polishing head **30** can move in a single erection in the head sweep HS along the redial direction of the polishing platen **32** during the polishing process. The polishing head **30** also can move back and forth in the head sweep HS along the redial direction of the polishing platen **32** during the polishing process.

[0021] After the polished films of the wafers have been polished sequentially using the corresponding polishing parameters, the polished films of the wafers are measured so as to obtain a number of status data of the polished films corresponding to the polishing parameters. In the present embodiment, each of the status data is a removal rate distribution of the polished film of each of the wafers.

[0022] The status data of the polished film of the wafers will be described as follow. Further referring to FIG. **4**, each of the wafers defines a number of annular regions around a center of the wafer on the polished film, for example, from a region R**1** to a region Rn (n is an integer). In the present embodiment, the head sweep HS is supposed to be in a range from 5.3 inches to 8.3 inches. Thus, during polishing the wafers sequentially, the head sweep HS can be increased by 0.5 inches step so as to obtain different polishing parameters to polish the wafers. As a result, in the case of each of the head sweep HS, the status data from the region R**1** to the region Rn of each of the wafers corresponding to the head sweep HS can be obtained, thereby obtaining the removal rate distribution of the polished film of each of the wafers. When a data base is established, a number of removal rates of the polished film from the region R**1** to the region Rn of are standardized. For example, a standardization value of the removal rate in the region R**1** is equal to 1, a standardization value of the removal rate in the region R**2** is equal to a ratio of an absolute value of the removal rate in the region R**2** to an absolute value of the removal rate in the region R**1**, and so on, a standardization value of the removal rate in the region Rn is equal to a ratio of an absolute value of the removal rate in the region Rn to the absolute value of the removal rate in the region R**1**. The absolute value of the removal rate in the region R**1** is an average value of the removal rates in the whole region R**1**, the absolute value of the removal rate in the region R**2** is an average value of the removal rates in the whole region R**2**, and so on, the absolute value of the removal rate in the region Rn is an average value of the removal rates in the whole region Rn.

[0023] It is supposed that the number of the head sweep HS is m, and the number of the wafers to be polished is also m. In the present embodiment, the head sweep HS is supposed to be in a range from 5.3 inches to 8.3 inches and is increased by 0.5 inches step during polishing the wafers sequentially, so the m is equal to 6. Then, a data table is established, which includes the head sweeps and the standardization values of the removal rates of the polished film of each of the wafers. In the case of the ith (i=1, 2, . . . m) head sweep HSi, the standardization values of the removal rates in the region Rj (j=1, 2, . . . n) of the wafer V(i,j) is defined. The established data table is shown as Table 1.

TABLE 1

Number	HS(inches)	Region R1	Region R2	. . .	Region Rn
1	5.3~5.8	V(1, 1)	V(1, 2)	. . .	V(1, n)
2	5.8~6.3	V(2, 1)	V(2, 2)	. . .	V(2, n)
. . .	. . .	. . .	. . .	. . .	. . .
m	7.8~8.3	V(m, 1)	V(m, 1)	. . .	V(m, n)

[0024] According to the data in the Table 1, a linearity simulation of the head sweep HSi and the standardization value of the removal rate of the polished film in each region of the wafer V(i,j) can be performed, thereby obtaining a linear relationship formula, for example, Y=0.8X+0.2. In the formula, X refers to the number i of the head sweep HS, and Y refers to the standardization value of the removal rate of the polished film in each region of the wafer V(i,j). It is noted that a related coefficient R of the linearity simulation is generally related to the simulation degree of the linearity simulation. The larger the related coefficient R of the linearity simulation is, the better the simulation degree of the linearity simulation is. When $R^2>0.7$, the expected optimization linear relationship formula can be obtained. A data base is established, which includes the status data (the removal rate distribution of the polished film) and the corresponding polishing parameters (the head sweep). Thus, a polishing parameter of a wafer to be polished can be determined according to the data base. In the present embodiment, the data base is stored in an advanced process control system. A polishing process of the wafer to be polished is controlled using the advanced process control system.

[0025] Controlling the polishing process of the wafer using the advanced process control system includes the following steps. Again, referring to FIG. **2**, after the data base is established, a first wafer having a predetermined status data is provided, as shown in the step **22**. In the present embodiment, the predetermined status data of the first wafer is a removal rate distribution of the polished film.

[0026] Thereafter, as shown in the step **23**, the predetermined status data is compared with the status data in the database stored in the advanced process control system. When the advance process control system has found out a status data matched with (i.e., identical to or similar to) the predetermined status data. The polishing parameter corresponding to the matched status data (i.e., the predetermined status data) can be a first polishing parameter of the first wafer. For example, the advanced process control system can find out a status data in the case of the second head sweep HS**2** in the data base is matched with the predetermined status data of the first wafer. Thus, the determined first polishing parameter of the first wafer includes the second head sweep HS**2**. The advanced process control system can control a polishing device to perform a first polishing process using the determined first polishing parameter to polish the first wafer, as shown in the step **24**. In the first polishing process, the second head sweep HS**2** is a first head sweep of the first polishing parameter of the first wafer. The polishing head **30** can moves back and forth in the first head sweep along the redial direction of the polishing platen **32** during the first polishing process.

[0027] In order to optimize the polishing parameter, the method for controlling polishing the wafer further includes the following steps. As shown in the step **25**, a second wafer is provided. The second wafer has the predetermined status data identical to the predetermined status data of the first wafer. That is, in the preset embodiment, the predetermined status data of the second wafer is a removal rate distribution of the polished film. The removal rate distribution of the polished film of the second wafer is identical to the removal rate distribution of the polished film of the first wafer.

[0028] After the first wafer is polished by the first polishing process, the advanced process control system controls a measuring device to measure the polished first wafer so as to obtain a measuring status data of the first wafer. The measuring status data is a measuring removal rate distribution of the polished film of the first wafer. The measuring status data will be feed back to the advanced process control system. The measuring device can be disposed according to the status data to be measured. In the present embodiment, the measuring device for measuring the removal rate of the polished film is applied.

[0029] Then, as shown in the step **27**, according to the data base stored in the advanced process control system, the measuring status data is compared with the predetermined status data of the second wafer so as to obtain an amended status data to update the data base. A polishing parameter corresponding to the amended status data can be found out in the updated data base, thereby determining a second polishing parameter of the second wafer.

[0030] In detail, in the step **27**, a correcting value Uj (j=1, 2, . . . n) of the removal rate in the region Rj (j=1, 2, . . . n) of the polished film of the first wafer can be obtained respectively. The correcting value Uj (j=1, 2, . . . n) of the removal rate in the region Rj (j=1, 2, . . . n) can be equal to a ratio of a status value of the measuring status data in the region Rj (j=1, 2, . . . n) to a status value of the predetermined status data in the region Rj (j=1, 2, . . . n). The amended status data can be calculated by the measuring status data and the correcting value Uj (j=1, 2, . . . n) of the removal rate in the region Rj (j=1, 2, . . . n). In the present embodiment, the amended status data are equal to the status value of the measuring status data in each of the regions is respectively multiplied by the corresponding correcting value. The amended status data can be calculated by the measuring status data and the correcting value Uj (j=1, 2, . . . n) of the removal rate. In the present embodiment, the amended status data are equal to the status value of the measuring status data in the region Rj (j=1, 2, . . . n) of the first wafer is respectively multiplied by the corresponding correcting value Uj (j=1, 2, . . . n) of the removal rate.

[0031] For example, in the present embodiment, the measuring device measures the status data of the polished film of the first wafer so as to obtain a number of standardization values of the measured removal rates from the region R**1** to the region Rn of the first wafer. That is, the status values from the region R**1** to the region Rn of the first wafer are the standardization values of the measured removal rates from the region R**1** to the region Rn. According to the standardization values of the measured removal rates from the region R**1** to the region Rn of the first wafer, the V(i,j) corresponding to the first polishing parameter can be refreshed and updated, thereby obtaining Vnew(i,j). For example, in the data base, in the case of the second head sweep HS**2**, the standardization value of the removal rate V(2,2) in the region R**2** is 1.2 and the standardization value of the measured removal rate in the region R2 is 1.3. As a result, in the updated data base, in the case of the second head sweep HS2, Vnew (2,j)=1.3/1.2*V (2,j), j=1, 2, . . . n. Meanwhile, the linear relationship formula of the head sweep HS and the standardization value of the removal rate of the polished film in each region of the wafer is also updated according to the update database. Thus, the second head sweep HS2 corresponding to the amended status data can also be refreshed and updated, thereby optimizing the second head sweep HS2. It is noted that above-motioned description is only an example of the region R2 of the wafer. In fact, the other regions of the first wafer can be performed a correction similar to the region R2 so as to refresh and update the whole data base.

[0032] Accordingly, the advance process control system can found out a polishing parameter (e.g., the refreshed and updated second head sweep HS2) corresponding to the amended status data in the updated data base. The polishing parameter (e.g., the refreshed and updated second head sweep HS2) corresponding to the amended status data in the updated data base can be a second polishing parameter of the second wafer. Thus, the advanced process control system can control the polishing device to perform a second polishing process using the second polishing parameter to polish the second wafer, as shown in the step **28**. In the second polishing process, the refreshed and updated second head sweep HS2 is a second head sweep of the second polishing parameter of the second wafer. The polishing head **30** can moves back and forth in the second head sweep along the redial direction of the polishing platen **32** during the second polishing process.

[0033] It is noted that, the status data of the polished film of the wafer can be represented by other status value except the removal rate distribution of the polished film. For example, a removal thickness distribution of the polished film or a thickness distribution of the polished film (i.e., a remaining thickness distribution of the polished film) can be the status data of the polished film. Referring to FIGS. **5**A to **5**F, the status data of the polished film of each of the wafers is a thickness distribution of the polished film (i.e., the remaining thickness distribution of the polished film) in accordance with another embodiment of the present invention. The data base is established using the thickness distributions of the polished film and the corresponding head sweep HS. In the present embodiment, similarly, the advanced process control system is applied to control the polishing process of the polished film of the wafer. The controlling steps are similar to the controlling steps the first embodiment and are not described here.

[0034] The above description is given by way of example, and not limitation. Given the above disclosure, one skilled in the art could devise variations that are within the scope and spirit of the invention disclosed herein, including configurations ways of the recessed portions and materials and/or designs of the attaching structures. Further, the various features of the embodiments disclosed herein can be used alone, or in varying combinations with each other and are not intended to be limited to the specific combination described herein. Thus, the scope of the claims is not to be limited by the illustrated embodiments.

What is claimed is:

1. A method for controlling polishing a wafer, comprising:
- establishing a database storing a plurality of status data of a polished film of a wafer and a plurality of polishing parameters corresponding to the status data, each of the polishing parameters at least comprising a head sweep of a polishing head along a redial direction of a polishing platen, the head sweep referring to a movement distance range from a center of the polishing head to a center of the polishing platen during a polishing process;
- providing a first wafer having a predetermined status data;
- comparing the predetermined status data with the status data stored in the database so as to find out a polishing parameter corresponding to the predetermined status data, thereby determining a first polishing parameter of the first wafer; and
- performing a first polishing process using the first polishing parameter to polish the first wafer.

2. The method as claimed in claim **1**, wherein the first polishing parameter comprises a first head sweep, and the polishing head moves back and forth in the first head sweep along the redial direction of the polishing platen during the first polishing process.

3. The method as claimed in claim **1**, wherein the polished film is a copper film.

4. The method as claimed in claim **1**, wherein each of the status data is a thickness distribution of the polished film.

5. The method as claimed in claim **1**, wherein each of the status data is a removal rate distribution of the polished film.

6. The method as claimed in claim **1**, further comprising:
- providing a second wafer having the predetermined status data;
- measuring the first wafer polished by the first polishing process to obtain a measuring status data of the first wafer;
- comparing the measuring status data with the predetermined status data so as to obtain an amended status data to update the data base, thereby finding out a polishing parameter corresponding to the amended status data in the updated data base to determine a second polishing parameter of the second wafer; and
- performing a second polishing process using the second polishing parameter to polish the second wafer.

7. The method as claimed in claim **6**, wherein in the step of comparing the measuring status data with the predetermined status data, a plurality of regions are defined on the first wafer so as to obtain a correcting value of each of the regions, the correcting value of each of the regions is equal to a ratio of a status value of the measuring status data in each of the regions to a status value of the predetermined status data in the corresponding region, and the amended status data are equal to the status value of the predetermined status data in each of the regions respectively multiplied by the corresponding correcting value.

8. The method as claimed in claim **6**, the second polishing parameter comprises a second head sweep, and the polishing head moves back and forth in the second head sweep along the redial direction of the polishing platen during the second polishing process.

9. The method as claimed in claim **6**, wherein each of the status data is a thickness distribution of the polished film.

10. The method as claimed in claim **6**, wherein each of the status data is a removal rate distribution of the polished film.

11. A method for controlling polishing a wafer, comprising:
- providing a plurality of wafers, the wafers having an identical polished film;
- polishing the polished films of the wafers sequentially using a plurality of polishing parameters, each of the polishing parameters comprising a head sweep of a pol-

ishing head along a redial direction of a polishing platen, the head sweep referring to a movement distance range from a center of the polishing head to a center of the polishing platen during a polishing process;

measuring the polished wafers so as to obtain a plurality of status data of the polished films;

establishing a data base comprising a relationship of the status data and the polishing parameters corresponding to the status data;

storing the database in an advanced process control system; and

controlling a polishing process of a wafer using the advanced process control system.

12. The method as claimed in claim **11**, wherein each of the status data is a thickness distribution of the polished film.

13. The method as claimed in claim **11**, wherein each of the status data is a removal rate distribution of the polished film.

14. The method as claimed in claim **11**, wherein the step of controlling the polishing process of the wafer using the advanced process control system comprises:

providing a first wafer having a predetermined status data;

finding out a polishing parameter corresponding to the predetermined status data in the database using the advanced process control system according to predetermined status data, thereby determining a first polishing parameter of the first wafer; and

controlling a polishing device using the advanced process control system to perform a first polishing process using the first polishing parameter to polish the first wafer.

15. The method as claimed in claim **14**, wherein the step of controlling the polishing process of the wafer using the advanced process control system further comprises:

providing a second wafer having the predetermined status data;

controlling a measuring device using the advanced process control system to measure the first wafer polished by the first polishing process, thereby obtaining a measuring status data of the first wafer to feed back to the advanced process control system;

comparing the measuring status data with the predetermined status data using the advanced process control system so as to obtain an amended status data to update the data base, thereby finding out a polishing parameter corresponding to the amended status data in the updated data base to determine a second polishing parameter of the second wafer; and

controlling the polishing device using the advanced process control system to perform a second polishing process using the second polishing parameter to polish the second wafer.

16. The method as claimed in claim **9**, wherein in the step of comparing the measuring status data with the predetermined status data, a plurality of regions are defined on the first wafer so as to obtain a correcting value of each of the regions, the correcting value of each of the regions is equal to a ratio of a status value of the measuring status data in each of the regions to a status value of the predetermined status data in the corresponding region, and the amended status data are equal to the status value of the predetermined status data in each of the regions respectively multiplied by the corresponding correcting value.

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