CLAIMS

1. A method for refreshing a polishing pad, the method comprising:

supplying water vapor to a polishing pad,

wherein the polishing pad includes a polishing layer provided with a polishing surface;

the polishing layer includes a plurality of pores; and

the polishing surface includes a fine concave portion derived from the plurality of pores,

wherein in the supplying water vapor to the polishing pad, the polishing pad corresponds to any one or more of the following conditions i) to iv):

i) the polishing pad is a pad after being used in a polishing process;

ii) the polishing surface having three-dimensional arithmetic mean surface roughness (Sa) of 6 μm or less;

iii) the polishing surface having an reduced peak height (Spk) of 5 μm or less;

iv) the polishing surface having an reduced valley depth (Svk) of 16 μm or less,

wherein the supplying of water vapor to a polishing pad is conducted while the polishing pad is installed on a surface plate,

wherein the supplying of water vapor to a polishing pad is supplying water vapor of 50℃ to 120℃ for 1 minute to 10 minutes.

2. The method of claim 1, wherein, in the supplying of water vapor to a polishing pad, a rate of change in surface roughness (Sa) of the polishing

surface caused by a change in a shape of the fine concave portion is from 30% to 70% by the following Equation 1:

[Equation 1]

$(Sa_r\text{-}Sa_f)/Sa_f \times 100$

herein,

Sa_f is surface roughness (Sa) of the polishing surface immediately before supplying water vapor to the polishing pad; and

Sa_r is surface roughness (Sa) of the polishing surface immediately after supplying water vapor to the polishing pad.

3 . The method of claim 1, further comprising conditioning the polishing surface.

4 . The method of claim 1, wherein, after the supplying of water vapor to a polishing pad, the polishing layer has a polishing restoration index (PRI) represented by the following Equation 2 of 3.10 to 3.80:

[Equation 2]

$$\mathbf{PRI} = \frac{(S_{pk}+S_{vk})}{S_a}$$

herein,

Sa is an ISO 25178 three-dimensional arithmetic mean surface roughness Sa value;

Spk is a value for an average height of peaks deducing from the center of the surface of the polishing layer; and

Svk is a value for an average height of grooves protruding downward from the center of the surface of the polishing layer.

5. A method for manufacturing a semiconductor device, the method comprising:

installing a polishing pad including a polishing surface on a surface plate;

arranging a surface to be polished of a subject to be polished to be in contact with the polishing surface, and then polishing the subject to be polished while rotating the polishing pad and the subject to be polished relative to each other under a pressurized condition; and

supplying water vapor to the polishing surface of the polishing pad,

wherein in the supplying water vapor to the polishing surface of the polishing pad, the polishing pad corresponds to any one or more of the following conditions i) to iv):

i) the polishing pad is a pad after being used in a polishing process;

ii) the polishing surface having three-dimensional arithmetic mean surface roughness (Sa) of 6 μm or less;

iii) the polishing surface having an reduced peak height (Spk) of 5 μm or less;

iv) the polishing surface having an reduced valley depth (Svk) of 16 μm or less,

wherein in the supplying water vapor to the polishing surface of the polishing pad is conducted while the polishing pad is installed on the surface plate,

wherein the supplying of water vapor to the polishing surface of the polishing pad is supplying water vapor of 50℃ to 120℃ for 1 minute to 10 minutes.

6. The method of claim 5, further comprising conditioning the polishing surface.

7. An apparatus for manufacturing a semiconductor device, the apparatus comprising:

a surface plate on which a polishing pad is installed;

a carrier in which a semiconductor substrate is installed; and

a water vapor spray unit,

wherein the water vapor spray unit supplies water vapor to the polishing pad installed on the surface plate,

wherein the water vapor spray unit supplies water to the polishing pad which corresponds to any one or more of the following conditions i) to iv):

i) the polishing pad is a pad after being used in a polishing process;

ii) the polishing surface having three-dimensional arithmetic mean surface roughness (Sa) of 6 μm or less;

iii) the polishing surface having an reduced peak height (Spk) of 5 μm or less;

iv) the polishing surface having an reduced valley depth (Svk) of 16 μm or less,

wherein the water vapor spray unit supplies water vapor of 50℃ to 120℃ for 1 minute to 10 minutes.