WHAT IS CLAIMED IS:

1. A polishing pad comprising a polishing layer,

wherein the polishing layer comprises a cured product of a preliminary composition containing a urethane-based prepolymer,

wherein, the preliminary composition contains a reaction product of an isocyanate compound and a polyol compound,

wherein, the total amount of the polyol compound is about 100 parts by weight to about 250 parts by weight based on 100 parts by weight of the total amount of the isocyanate compound,

wherein, the isocyanate compound includes an aromatic diisocyanate and an alicyclic diisocyanate, and wherein a nuclear magnetic resonance (NMR) ^{13}C spectrum of a processed composition prepared by adding 1 g of the polishing layer to a 0.3 M aqueous solution of potassium hydroxide (KOH) and allowing the mixture to react in a closed container at a temperature of 150°C for 48 hours includes a first peak appearing at 15 ppm to 18 ppm, a second peak appearing at 9 ppm to 11 ppm, a third peak appearing at 138 ppm to 143 ppm, and a fourth peak appearing at 55 ppm to 65 ppm, and

a softening control index calculated by Equation 1 below is 0.10 to 0.45: [Equation 1]

$$\textbf{Softening control index} = \frac{\textbf{I4}}{\textbf{100+I2+I3}}$$

wherein I2 is a ratio of the area of the second peak to the area of the first peak which is taken as 100.00, I3 is a ratio of the area of the third peak to the area of the first peak which is taken as 100.00, and I4 is a ratio of the area of the fourth peak to the area of the first peak which is taken as 100.00.

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2. The polishing pad of claim 1, wherein

a percentage of the area of the fourth peak relative to a total area of the first peak and the second peak is 30% to 75%, and

a percentage of the total area of the first peak and the second peak relative to a total area of the first peak, the second peak and the third peak is 60% to 70%,

an area ratio of the third peak to the second peak is 1:1 to 5:1,

an area ratio of the first peak to the second peak is 10:1 to 10:5, and

an area ratio of the first peak to the third peak is 10:5 to 10:10.

3. The polishing pad of claim 1, wherein

the polishing layer has a value of 1 to 2 as calculated according to Equation 2 below:

[Equation 2]

$$\frac{Mw - Mn}{Mp - Mn}$$

wherein Mw, Mn and Mp are molecular weights measured by gel permeation chromatography (GPC) for a depolymerized composition prepared by adding 1 g of the polishing layer to 15 ml of a 0.3 M aqueous solution of KOH and depolymerizing the polishing layer in a closed container at 150°C for 48 hours,

Mw is the weight-average molecular weight of the depolymerized composition,

Mn is the number-average molecular weight of the depolymerized composition, and

Mp is the peak molecular weight of the depolymerized composition.

4. The polishing pad of claim 3, wherein

the weight-average molecular weight (Mw) is 2,600 to 4,000, and

the number-average molecular weight (Mn) is 2,500 to 3,000.

5. The polishing pad of claim 1, wherein

a nuclear magnetic resonance (NMR) ^{13}C spectrum of the preliminary composition shows a fifth peak and a sixth peak in descending order of peak position (ppm) at 16 ppm to 20 ppm, and

an area ratio of the fifth peak to the sixth peak is 1:1 to 5:1.

6. A method for producing a polishing pad, the method comprising steps of:

i) preparing a preliminary composition containing a reaction product of an isocyanate compound and a polyol compound, wherein, the total amount of the polyol compound is about 100 parts by weight to about 250 parts by weight based on 100 parts by weight of the total amount of the isocyanate compound,

wherein, the isocyanate compound includes an aromatic diisocyanate and an alicyclic diisocyanate;

ii) preparing a composition for producing a polishing layer containing the preliminary composition, a foaming agent and a curing agent; and

iii) producing a polishing layer by curing the composition for producing a polishing layer,

wherein a nuclear magnetic resonance (NMR) ^{13}C spectrum of a processed composition prepared by adding 1 g of the polishing layer to a 0.3 M aqueous solution of potassium hydroxide (KOH) and allowing the mixture to react in a closed container at a temperature of 150°C for 48 hours includes a first peak appearing at 15 ppm to 18 ppm, a second peak appearing at 9 ppm to 11 ppm, a third peak appearing at 138 ppm to 143 ppm, and a fourth peak appearing at 55 ppm to 65 ppm,

an area ratio of the third peak to the second peak is 1:1 to 5:1, and

a softening control index calculated by Equation 1 below is 0.10 to 0.45:

[Equation 1]

$$\text{Softening control index} = \frac{I4}{100+I2+I3}$$

wherein

I2 is a ratio of the area of the second peak to the area of the first peak which is taken as 100.00, I3 is a ratio of the area of the third peak to the area of the first peak which is taken as 100.00, and I4 is a ratio of the area of the fourth peak to the area of the first peak which is taken as 100.00.

7. The method of claim 6, wherein the polishing layer has a value of 1 to 2 as calculated according to Equation 2 below:

[Equation 2]

$$\frac{Mw - Mn}{Mp - Mn}$$

wherein Mw, Mn and Mp are molecular weights measured by gel permeation chromatography (GPC) for a depolymerized composition prepared by adding 1 g of the polishing layer to 15 ml of a 0.3 M aqueous solution of KOH and depolymerizing the polishing layer in a closed container at 150°C for 48 hours,

Mw is the weight-average molecular weight of the depolymerized composition,

Mn is the number-average molecular weight of the depolymerized composition, and

Mp is the peak molecular weight of the depolymerized composition.

8. The method of claim 6, wherein

the prepolymer composition is a urethane-based prepolymer,

the urethane-based prepolymer has an isocyanate (NCO) group content of 5 to 10 wt%, and

a molar ratio of the NH_2 group of the curing agent to the isocyanate (NCO) group of the urethane-based prepolymer in the composition for producing an polishing layer in step ii) is 0.8 to 1.

9. A method for fabricating a semiconductor device, the method comprising steps of:

providing a polishing pad comprising a polishing layer; and

placing a polishing target surface of a polishing target so as to be in contact with a polishing surface of the polishing layer and then polishing the polishing target while allowing the polishing target and the polishing pad to rotate relative to each other,

wherein the polishing target comprises a semiconductor substrate,

wherein, the polishing layer comprises a cured product of a preliminary composition containing a urethane-based prepolymer,

wherein, the preliminary composition contains a reaction product of an isocyanate compound and a polyol compound,

wherein, the total amount of the polyol compound is about 100 parts by weight to about 250 parts by weight based on 100 parts by weight of the total amount of the isocyanate compound,

wherein, the isocyanate compound includes an aromatic diisocyanate and an alicyclic diisocyanate,

wherein a nuclear magnetic resonance (NMR) ^{13}C spectrum of a processed composition prepared by adding 1 g of the polishing layer to a 0.3 M aqueous solution of potassium hydroxide (KOH) and allowing the mixture to react in a closed container at a temperature of 150°C for 48 hours includes a first peak appearing at 15 ppm to 18 ppm, a second peak appearing at 9 ppm to 11 ppm, a third peak appearing at 138 ppm to 143 ppm, and a fourth peak appearing at 55 ppm to 65 ppm,

an area ratio of the third peak to the second peak is 1:1 to 5:1, and

a softening control index calculated by Equation 1 below is 0.10 to 0.45:

[Equation 1]

$$\textbf{Softening control index} = \frac{I4}{100+I2+I3}$$

wherein I2 is a ratio of the area of the second peak to the area of the first peak which

is taken as 100.00, I3 is a ratio of the area of the third peak to the area of the first peak which is taken as 100.00, and I4 is a ratio of the area of the fourth peak to the area of the first peak which is taken as 100.00.

10. The method of claim 9, wherein the polishing layer has a value of 1 to 2 as calculated according to Equation 2 below:

[Equation 2]

$$\frac{Mw - Mn}{Mp - Mn}$$

wherein

Mw, Mn and Mp are molecular weights measured by gel permeation chromatography (GPC) for a depolymerized composition prepared by adding 1 g of the polishing layer to 15 ml of a 0.3 M aqueous solution of KOH and depolymerizing the polishing layer in a closed container at 150°C for 48 hours,

Mw is the weight-average molecular weight of the depolymerized composition,

Mn is the number-average molecular weight of the depolymerized composition, and

Mp is the peak molecular weight of the depolymerized composition.