

provide a polishing pad which is capable of providing a high flatness to a polishing workpiece, and also capable of suppressing the formation of scratches, and a method for producing the polishing pad.

5 Another object of the present invention is to provide a polishing pad capable of providing a high flatness to both a center portion and an outer circumferential portion of a polishing workpiece, and a method for producing the polishing pad.

10 Still another object of the present invention is to provide a polishing pad capable of stably providing a high flatness even in repeated polishing, while suppressing change with time, and a method for producing the polishing pad.

Summary

15 In one aspect, the present invention refers to a polishing pad comprising a foamed urethane sheet which is provided on a surface thereof and which includes closed cells and open cells, wherein the foamed urethane sheet satisfies the following requirements (1) to (3): (1) an open cell ratio is 40 to 75%
20 by volume, the open cell ratio being the volume ratio of the open cells, where the total volume of the closed cells and the open cells is taken as 100% by volume, (2) the ratio [$\tan\delta$ (wet/dry) ratio] of a loss factor $\tan\delta$ in a water-absorption state to a loss factor $\tan\delta$ in a dry state is 1.3 to 1.7, the
25 loss factors being measured according to JIS K7244-4 with an initial load of 20 g at a measuring frequency of 1 Hz at a temperature of 26°C in a tensile mode over a strain range from 0.01 to 0.1%, and (3) the Shore DO hardness measured according to ASTM D2240 is 60 to 80. In another aspect, the present
30 invention refers to a method for producing a polishing pad

comprising a foamed urethane sheet which is provided on a surface thereof and which includes closed cells and open cells, the method comprising step (a) of pouring a curable composition, which comprises a urethane prepolymer into a mold; and step
5 (b) of foaming and curing the curable composition in the mold, wherein in the step (b), the curable composition is foamed and cured without closing the mold with an upper lid, or when the curable composition is foamed and cured with the mold being closed with an upper lid in the step (b), the curable composition
10 is poured in the step (a) in such an amount that a foamed and cured product of the curable composition does not come into contact with the upper lid of the mold.

Solution to Problems

The present inventors have conducted intensive study to
15 achieve the above-described objects, and consequently have found that a polishing pad comprising a foamed urethane sheet which is provided on a surface thereof and which includes closed cells and open cells, in which (1) the open cell ratio (the volume ratio of the open cells to the total of the closed cells and
20 the open cells), (2) the ratio of a loss factor $\tan\delta$ in a water-absorption state to a loss factor $\tan\delta$ in a dry state [hereinafter, this ratio is also referred to as " $\tan\delta$ (wet/dry) ratio"], and (3) the Shore D hardness are each adjusted to a specific range and are combined, is not only capable of
25 providing a high flatness to a polishing workpiece, but also capable of reducing the occurrence of scratches. This finding has led to the completion of the present invention.

Specifically, the present invention includes the following modes.

Claims

Claim 1

A polishing pad comprising a foamed urethane sheet which is provided on a surface thereof and which includes closed cells and open cells, wherein

the foamed urethane sheet satisfies the following requirements (1) to (3):

(1) an open cell ratio is 40 to 75% by volume, the open cell ratio being the volume ratio of the open cells, where the total volume of the closed cells and the open cells is taken as 100% by volume,

(2) the ratio [$\tan\delta$ (wet/dry) ratio] of a loss factor $\tan\delta$ in a water-absorption state to a loss factor $\tan\delta$ in a dry state is 1.3 to 1.7, the loss factors being measured according to JIS K7244-4 with an initial load of 20 g at a measuring frequency of 1 Hz at a temperature of 26°C in a tensile mode over a strain range from 0.01 to 0.1%, and

(3) the Shore D0 hardness measured according to ASTM D2240 is 60 to 80.

Claim 2

The polishing pad according to claim 1, wherein

the foamed urethane sheet includes the closed cells at a ratio of 15 to 35% by volume, the open cells at a ratio of 30 to 45% by volume, and a resin portion at a ratio of 35 to 45% by volume, provided that the total of the closed cells, the open cells, and the resin portion is taken as 100% by volume.

Claim 3

The polishing pad according to claim 1 or 2, wherein

the average opening diameter on a surface of the foamed urethane sheet is 70 to 90 μm .

Claim 4

A method for producing a polishing pad comprising a foamed urethane sheet which is provided on a surface thereof and which includes closed cells and open cells, the method

comprising:

step (a) of pouring a curable composition, which comprises a urethane prepolymer into a mold; and

step (b) of foaming and curing the curable composition in the mold, wherein

in the step (b), the curable composition is foamed and cured without closing the mold with an upper lid, or

when the curable composition is foamed and cured with the mold being closed with an upper lid in the step (b), the curable composition is poured in the step (a) in such an amount that a foamed and cured product of the curable composition does not come into contact with the upper lid of the mold.