Claim 5 The semiconductor wafer surface protection film according to claim 1, wherein the base layer (A) is an outermost layer of the semiconductor wafer surface protection film.

Claim 6 The semiconductor wafer surface protection film according to claim 4, wherein the adhesive layer (C) is an outermost layer positioned opposite to the base layer (A) across the softening layer (B).

Claim 7 The semiconductor wafer surface protection film according to claim 1, wherein the softening layer (B) includes a homopolymer of a hydrocarbon olefin, a copolymer of a hydrocarbon olefin, or a mixture thereof.

Claim 8 The semiconductor wafer surface protection film according to claim 1, wherein a resin constituting the softening layer (B) has a density of 880 to 960 kg/m^3.

Claim 9 The semiconductor wafer surface protection film according to claim 1, wherein the base layer (A) is a polyolefin layer, a polyester layer, or a laminate of the polyolefin layer and the polyester layer.

~~Claim 10 A method of manufacturing a semiconductor device, comprising:~~

~~disposing a semiconductor wafer on a semiconductor wafer~~

~~surface protection film such that a patterned surface of the semiconductor wafer contacts the semiconductor wafer surface protection film;~~

~~forming around a circumference of the semiconductor wafer a raised portion of the semiconductor wafer surface protection film for holding the semiconductor wafer;~~

~~grinding a non-patterned surface of the semiconductor wafer held by the raised portion; and~~

~~separating the semiconductor wafer surface protection film from the patterned surface of the semiconductor wafer,~~

~~wherein a storage elastic modulus at 100°C (G(100)) of the raised portion is equal to or higher than 1 MPa.~~

Claim ~~11~~10 A method of manufacturing a semiconductor device, comprising:

disposing a semiconductor wafer on a semiconductor wafer surface protection film such that a patterned surface of the semiconductor wafer contacts the semiconductor wafer surface protection film;

forming around a circumference of the semiconductor wafer a raised portion of the semiconductor wafer surface protection film for holding the semiconductor wafer;

grinding a non-patterned surface of the semiconductor wafer held by the raised portion; and

separating the semiconductor wafer surface protection film from the patterned surface of the semiconductor wafer,

wherein a storage elastic modulus at 100°C (G(100)) of the raised portion is equal to or higher than 1 MPa,

~~The method according to claim 10, wherein~~ the semiconductor wafer surface protection film is the semiconductor wafer surface

protection film according to claim 1, and

the raised portion is formed by performing thermocompression bonding for the semiconductor wafer surface protection film and the semiconductor wafer under a pressure of 1 to 10 MPa at 120 to 180°C.

Claim ~~12~~11 The method according to claim ~~11~~10, wherein temperature TM of the film in the step of disposing the semiconductor wafer on the semiconductor wafer surface protection film such that the patterned surface of the semiconductor wafer contacts the semiconductor wafer surface protection film, a thermocompression bonding temperature TP in the step of forming the raised portion of the semiconductor wafer

surface protection film, and softening temperature TmB of the softening layer (B) satisfy relationships represented by the following equations:

[1]

$TP \leq TM$ ...(Equation 1)

[2]

$TmB < TP < TmB + 40°C$ ...(Equation 2)

Claim ~~13~~12 The method according to claim ~~11~~10, wherein the semiconductor wafer is disposed on the semiconductor wafer surface protection film such that the softening layer (B) of the semiconductor wafer surface protection film is disposed on the patterned surface side of the semiconductor wafer relative to the base layer (A).

Claim ~~14~~13 The method according to claim 10, wherein the semiconductor wafer includes a high-hardness substrate having a Mohs' hardness of 8 or higher.

Claim ~~15~~14 A semiconductor wafer press apparatus that presses a mount frame that includes a semiconductor wafer, ring frame A having a rim surrounding the semiconductor wafer, and the semiconductor wafer surface protection film according to claim 1 attached over a patterned surface of the semiconductor wafer and the frame A, with the mount frame being interposed between an upper press plate having a heating mechanism and a lower press plate opposite to the upper press plate,

wherein outer diameter DW of the semiconductor wafer and inner diameter DA_{IN} of ring frame A satisfy the relationship Equation (1): $DW < DA_{IN}$,

the lower press plate has a protrusion on a surface opposite to the upper press plate, and

a circumference of a surface of the protrusion that makes contact with the mount frame at the time of pressing has a circular shape.

Claim ~~16~~15 The semiconductor wafer press apparatus according to claim ~~15~~14, wherein the protrusion has a height of 1 to 100 μm.

Claim ~~17~~16 The semiconductor wafer press apparatus according to claim ~~15~~14, wherein a height of the protrusion is within 15 to 100% of a thickness of the softening layer (B) of the semiconductor wafer surface protection film.

Claim ~~18~~17 The semiconductor wafer press apparatus according to claim ~~15~~14, wherein diameter CD of the protrusion satisfies the relationship $DW < CD < DA_{IN}$.

Claim ~~19~~18 A semiconductor wafer mount apparatus for manufacturing a mount frame including a semiconductor wafer, ring-like supporting member B surrounding the semiconductor wafer, ring frame A surrounding the semiconductor wafer and ring-like supporting member B, and the semiconductor wafer surface protection

film according to claim 1 attached over a patterned surface of the semiconductor wafer, ring-like supporting member B, and ring frame A,

wherein outer diameter DW of the semiconductor wafer, an inner diameter DA_{IN} of ring frame A, ring outer diameter DB_{OUT} of ring-like supporting member B, and ring inner diameter DB_{IN} of ring-like supporting member B satisfy the relationship Equation (1): $DW < DB_{IN} < DB_{OUT} < DA_{IN}$, and

the semiconductor wafer mount apparatus comprises:

a heating unit that heats a surface opposite to a patterned surface of the semiconductor wafer;

an attaching roller that rolls over a patterned surface of the semiconductor wafer, ring frame A, and ring-like supporting member B to attach the semiconductor wafer surface protection film; and

a tape cutting mechanism that cuts the surface protection film along an exterior shape of ring frame A.

Claim ~~20~~19 The semiconductor wafer mount apparatus according to claim ~~19~~18, wherein both differences $\Delta D1$ and $\Delta D2$ expressed as the following equations are within 1% of outer diameter DW of the semiconductor wafer:

$\Delta D1 = DB_{IN} - DW$; ... (2)

$\Delta D2 = DA_{IN} - DB_{OUT}$ ... (3)