

[0013]

According to a first aspect, there is provided a method for preparing a composite substrate, comprising the steps of:
~~bonding a semiconductor substrate to a support substrate, and~~
5 ~~thinning the semiconductor substrate for thereby yielding a~~
~~composite substrate having a semiconductor layer on the support~~
~~substrate, wherein~~

coating a polysilazane-containing coating composition is
~~formed on either one of the surfaces of the semiconductor~~
10 ~~substrate and thea support substrate to be bonded, to form a~~
polysilazane-containing coating, wherein the support substrate
is a substrate selected from the group consisting of single
crystal substrates of SiC and GaN, and polycrystalline
substrates of p-Si, SiC, Si₃N₄ and AlN, subjecting the coating
15 ~~is subjected to firing treatment of heating at 600°C to 1,200°C~~
~~to form a silicon-containing insulating film, and thereafter,~~
bonding the semiconductor substrate is bonded to the support
substrate via the insulating film, while keeping the thickness
of the insulating film as of the firing treatment, and
20 thinning the semiconductor substrate for thereby yielding the
composite substrate having a semiconductor layer on the support
substrate.

Preferably, the polysilazane is a perhydropolysilazane.

Preferably, the firing treatment is carried out in an
25 atmosphere containing oxygen and/or steam.

Preferably, the firing treatment is carried out in an inert
atmosphere containing nitrogen or under reduced pressure.

~~Preferably, the semiconductor substrate and the support~~
~~substrate are bonded while keeping the thickness of the~~
30 ~~insulating film as of the firing treatment.~~

Preferably, the method comprises the steps of implanting ions
into the surface of the semiconductor substrate to form an ion-
implanted region, forming the silicon-containing insulating
film on the surface of the

CLAIMS:

1. A method for preparing a composite substrate, comprising the steps of:

~~bonding a semiconductor substrate to a support substrate, and thinning the semiconductor substrate for thereby yielding a composite substrate having a semiconductor layer on the support substrate, wherein~~

coating a polysilazane-containing coating is formed~~composition~~ on either ~~one of the~~ surfaces of the semiconductor substrate and ~~thea~~ support substrate to be bonded, to form a polysilazane-containing coating, wherein the support substrate is a substrate selected from the group consisting of single crystal substrates of SiC and GaN, and polycrystalline substrates of p-Si, SiC, Si₃N₄ and AlN,

subjecting the coating is~~subjected to~~ firing treatment of heating at 600°C to 1,200°C to form a silicon-containing insulating film, and thereafter,

bonding the semiconductor substrate is~~bonded to the~~ support substrate via the insulating film, while keeping the thickness of the insulating film as of the firing treatment, and

thinning the semiconductor substrate for thereby yielding the composite substrate having a semiconductor layer on the support substrate.

2. The method for preparing a composite substrate of claim 1 wherein the polysilazane is a perhydropolysilazane.

3. The method for preparing a composite substrate of claim 1 or 2 wherein the firing treatment is carried out in an atmosphere containing oxygen and/or steam.

4. The method for preparing a composite substrate of claim 1 or 2 wherein the firing treatment is carried out in an inert atmosphere containing nitrogen or under reduced pressure to convert polysilazane in the coating to SiN.

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~~5. The method for preparing a composite substrate of any one of claims 1 to 4 wherein the semiconductor substrate and the support substrate are bonded while keeping the thickness of the insulating film as of the firing treatment.~~

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5. The method for preparing a composite substrate of any one of claims 1 to 4 wherein the polysilazane-containing coating composition is spin coated onto the support substrate.

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6. The method for preparing a composite substrate of any one of claims 1 to 5 wherein the thickness of the insulating film as of the firing treatment is 10 nm to 200nm.

67. The method for preparing a composite substrate of any one of claims 1 to 5, the method comprising the steps of implanting ions into the surface of the semiconductor substrate to form an ion-implanted region, forming the silicon-containing insulating film on the surface of the support substrate to be bonded, bonding the ion-implanted surface of the semiconductor substrate to the surface of the support substrate via the insulating film, and separating the semiconductor substrate at the ion-implanted region, thus leaving a semiconductor layer on the support substrate.

~~7. A composite substrate obtained by the method of any one of claims 1 to 6.~~