layer between said buried brittle plane and a free surface of said donor layer,

d) a step of formation of a carrier substrate of silicon carbide on the free surface of the donor layer, comprising a deposition at a temperature of between600°C and 900°C and based on a chemical vapour deposition technique or a sintering technique or a liquid-phase deposition technique using a solution of ceramic powder, and defining a non-insulating interface between the donor layer and the carrier substrate,

e) a step of separation along the buried brittle plane, to form the composite structure on the one hand and the remnant of the donor substrate on the other hand,

f) a step of mechanical and/or chemical treatment(s) of the composite structure, to smooth the free surface of the thin layer and to correct the thickness uniformity of the composite structure.

According to other advantageous and non-limiting features of the invention, taken alone or according to any technically feasible combination:

- the deposition of step d) is carried out at a temperature of between 600°C and 900°C, and even, preferably, between 700°C and 800°C, and is based on a chemical vapour deposition technique or a sintering technique or a liquid-phase deposition technique using a solution of ceramic powder;
- the deposition of step d) is a chemical vapour deposition assisted by direct liquid injection;
- the deposition of step d) is a plasma-enhanced or low-pressure chemical vapour deposition;
- the deposition of step d) is carried out at a rate of greater than 10 microns/hour, and even, preferably, greater than 50 microns/hour;
- at the end of the deposition of step d), the carrier substrate has a thickness of greater than or equal to 50 microns, and even a thickness of greater than or equal to 100 microns;

CLAIMS

1. A process for producing a composite structure comprising a thin layer of monocrystalline silicon carbide arranged on a carrier substrate of silicon carbide, the process comprising:

a) a step of provision of an initial substrate of monocrystalline silicon carbide,

b) a step of epitaxial growth of a donor layer of monocrystalline silicon carbide on the initial substrate, carried out at a temperature greater than 1200°C, preferably of between 1500°C and 1650°C, to form a donor substrate, the donor layer having a lower crystal defect density than the initial substrate,

c) a step of ion implantation of light species into the donor layer, to form a buried brittle plane delimiting the thin layer between said buried brittle plane and a free surface of said donor layer,

d) a step of formation of a carrier substrate of silicon carbide on the free surface of the donor layer, comprising a deposition at a temperature of between 600°C and 900°C and based on a chemical vapour deposition technique or a sintering technique or a liquid-phase deposition technique using a solution of ceramic powder, and defining a non-insulating interface between the donor layer and the carrier substrate,

e) a step of separation along the buried brittle plane, to form the composite structure on the one hand and the remnant of the donor substrate on the other hand,

f) a step of mechanical and/or chemical treatment(s) of the composite structure, to smooth the free surface of the thin layer and to correct the thickness uniformity of the composite structure.

2. The process according to claim 1, wherein the deposition of step d) is carried out at a temperature of between 700°C and 800°C.

3. The process according to claim 1 or 2, wherein the deposition of step d) is a chemical vapour deposition assisted by direct liquid injection.

4. The process according to Claim 1 or 2, wherein the deposition of step d) is a plasma-enhanced or low-pressure chemical vapour deposition.

5. The process according to any of the preceding claims, wherein the deposition of step d) is carried out at a rate of greater than 10 microns/hour, and even, preferably, greater than 50 microns/hour.

6. The process according to any of the preceding claims, wherein, at the end of the deposition of step d), the carrier substrate has a thickness of greater than or equal to 50 microns, and even a thickness of greater than or equal to 100 microns.

7. The process according to any of the preceding claims, wherein step a) comprises the formation, on the initial substrate, of a monocrystalline conversion layer, for converting the basal plane dislocation defects of the initial substrate into threading edge dislocation defects.

8. The process according to any of the preceding claims, wherein the separation step e) is operated at a temperature greater than or equal to the temperature of the deposition of step d).

9. The process according to any of the preceding claims, wherein step f) comprises simultaneous chemical-mechanical polishing of a front face and a back face of the composite structure.

10. The process according to any of the preceding claims, further comprising a step of heat treatment at a temperature of between 1000°C and 1800°C, before or after step f).

11. The process according to any of the preceding claims, further comprising a step of reconditioning of the remnant of the donor substrate with a view to reusing it as initial substrate or as donor substrate.