

CLAIMS

1. A temporary substrate, which is detachable at a detachment temperature higher than 1000°C and comprises:
 - a semiconductor working layer extending along a main plane,
 - a carrier substrate,
 - an intermediate layer arranged between the working layer and the carrier substrate, and having a thickness, along an axis normal to the main plane, less than 20 nm,
 - a bonding interface located in the intermediate layer or adjacent thereto,
 - atoms of at least one gaseous species that are distributed according to a concentration profile along the axis normal to the main plane, with a maximum concentration higher than $10^{21}/\text{cm}^3$, said atoms remaining trapped in the intermediate layer and/or in an adjacent layer of the carrier substrate with a thickness less than or equal to 10 nm and/or in an adjacent sublayer of the working layer with a thickness less than or equal to 10 nm when the temporary substrate is subjected to a temperature lower than the detachment temperature, and said atoms being intended to diffuse to a detachment interface when the temporary substrate is subjected to a temperature higher than or equal to the detachment temperature.
2. The temporary substrate according to the preceding claim, wherein the intermediate layer is formed by at least one material chosen from among tungsten, nickel, titanium, aluminium, molybdenum, tantalum, titanium nitride, tantalum nitride, amorphous silicon.

3. The temporary substrate according to either of the preceding claims, wherein the gaseous species is nitrogen, helium, argon, xenon and/or hydrogen.
4. The temporary substrate according to one of the preceding claims, wherein the carrier substrate comprises a material the coefficient of thermal expansion of which is equal to or close to that of the working layer.
5. A process for producing a temporary substrate according to one of the preceding claims, comprising:
 - a) a step of providing a donor substrate,
 - b) a step of implanting light ions chosen from among hydrogen, helium, or a combination of the two into the donor substrate in order to form a buried weakened plane in said donor substrate, the buried weakened plane delimiting a surface working layer with a front face of the donor substrate,
 - c) a step of providing a carrier substrate having a front face,
 - d) a step of depositing at least one film on the front face of the donor substrate and/or on the front face of the carrier substrate, the at least one film being intended to form the intermediate layer,
 - e) joining the donor substrate and the carrier substrate such that the at least one film is arranged between said substrates so as to form the intermediate layer,
 - f) separating along the buried weakened plane in order to form, on the one hand, the temporary substrate and, on the other hand, the rest of the donor substrate,the production process further comprising a step of introducing atoms of the at least one gaseous species:

- into the donor substrate and/or into the carrier substrate to a depth less than or equal to 10 nm from their respective front faces, before deposition step d), or
 - into the at least one film, after deposition step d), or
 - into the intermediate layer, after separation step f).
6. The process for producing a temporary substrate according to claim 5, wherein step f) comprises a heat treatment at a temperature of between 900°C and 1200°C.
 7. A process for transferring a working layer from a temporary substrate according to one of Claims 1 to 4 to a receiver substrate, the process comprising:
 - g) a step of forming a detachable structure comprising a receiver substrate arranged on the working layer of the temporary substrate, the formation step involving a treatment at a first temperature higher than or equal to 1000°C,
 - h) a step of detaching the detachable structure along a detachment interface in or adjacent to the intermediate layer, the detachment step comprising a heat treatment at a detachment temperature higher than the first temperature in order to form, on the one hand, a composite structure comprising the working layer arranged on the receiver substrate and, on the other hand, the carrier substrate.
 8. The process for transferring a working layer from a temporary substrate according to claim 7, wherein step g) comprises the deposition of the receiver substrate on a free face of the working layer of the temporary substrate.
 9. The process for transferring a working layer from a temporary substrate according to claim 8, wherein the

deposition of the receiver substrate is performed by, thermal or enhanced, chemical vapour deposition, or by evaporation, at a temperature higher than or equal to 1000°C, preferably higher than or equal to 1200°C.

10. The process for transferring a working layer from a temporary substrate according to claim 8 or 9, wherein the receiver substrate formed is made of polycrystalline silicon carbide.
11. The process for transferring a working layer from a temporary substrate according to one of Claims 7 to 10, wherein step h) comprises a heat treatment at a temperature higher than or equal to 1400°C, or even higher than or equal to 1500°C.
12. The process for transferring a working layer from a temporary substrate according to one of Claims 7 to 11, comprising a step i) of finishing the composite structure, including an operation of chemical cleaning and/or chemical etching and/or chemical-mechanical polishing of the free face of the working layer, front face of the composite structure.
13. The process for transferring a working layer from a temporary substrate according to claim 12, wherein step i) comprises an operation of chemical cleaning and/or chemical etching and/or mechanical grinding and/or chemical-mechanical polishing of the free face of the receiver substrate, back face of the composite structure.
14. The process for transferring a working layer from a temporary substrate according to one of Claims 7 to 13, comprising a step g') of treating the detachable structure,

prior to detachment step h), including an operation of chemical cleaning and/or chemical etching and/or mechanical grinding and/or chemical-mechanical polishing of the back face of the receiver substrate.

15. The process for transferring a working layer from a temporary substrate according to one of Claims 7 to 14, comprising the production of electronic components in or on the working layer of the composite structure, potentially after the epitaxial growth of an additional layer on the working layer.