

ABSTRACT**PROCESS FOR MANUFACTURING A COMPOSITE STRUCTURE COMPRISING A THIN LAYER OF MONOCRYSTALLINE SiC ON A CARRIER SUBSTRATE MADE OF SiC**

The invention relates to a process for manufacturing a composite structure comprising a thin layer of monocrystalline silicon carbide arranged on a carrier substrate made of silicon carbide, the process comprising:

- a) a step of providing an initial substrate made of monocrystalline silicon carbide,
- b) a step of epitaxial growth of a monocrystalline silicon carbide donor layer on the initial substrate, to form a donor substrate 111,
- 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 direct liquid injection-chemical vapour deposition, at a temperature below 1000°C, to form a carrier layer directly on the free surface of the donor layer, said carrier layer being formed by an at least partially amorphous SiC matrix,
- e) a step of separating along the buried brittle plane to form, on the one hand, an intermediate composite structure comprising the thin layer on the carrier layer and, on the other hand, the rest of the donor substrate,
- f) a step of heat treatment at a temperature of between 1000°C and 1800°C, applied to the intermediate composite structure, to crystallize the carrier layer and to form the polycrystalline carrier substrate,
- g) a step of mechanical and/or chemical treatment(s) of the composite structure.

Fig. 2e