PROCESS FOR FABRICATING A COMPOSITE STRUCTURE COMPRISING A THIN LAYER MADE OF SINGLE-CRYSTAL SiC ON A CARRIER SUBSTRATE MADE OF POLYCRYSTALLINE SiC

ABSTRACT

The invention relates to a process for fabricating a composite structure comprising a thin layer made of single-crystal silicon carbide positioned on a carrier substrate made of polycrystalline silicon carbide, the process comprising:

a) a step of providing an initial substrate made of single-crystal silicon carbide, having a front face and a back face, and a carrier substrate made of polycrystalline silicon carbide having a front face and a back face,

b) a step of porosification applied to the initial substrate, in order to form a porous layer at least on the front face side of the initial substrate,

c) a step of forming a superficial layer made of amorphous silicon carbide, on the front face of the carrier substrate,

d) a step of joining the initial substrate and the carrier substrate at their respective front faces, leading to the production of a first intermediate structure,

e) a heat treatment step applied to the first intermediate structure, at a temperature above 900°C, in order to crystallize the superficial layer, at least partly in the form of single-crystal silicon carbide, starting from a contact interface with the porous layer, in order to form the thin layer, step e) leading to the production of a second intermediate structure,

f) a step of separation in the porous layer of the second intermediate structure, in order to obtain the composite structure on the one hand and the remainder of the initial substrate on the other hand.

Fig. 2e