d0) a step of subjecting to a heat treatment intended to initiate the propagation of a fracture wave within the weakened zone and then to transfer the working layer to the main face of the support substrate.

This process is implemented advantageously provided the materials forming the working layer and the support substrate have different coefficients of thermal expansion. More specifically, the process disclosed in document FR3068508A1, aimed at reducing the risk of uncontrolled fracture or of partial transfer or defectiveness of the working layer, proposes the use of a handle substrate made of a material having a coefficient of thermal expansion similar to that of the material forming the support substrate.

Nevertheless, the use of a donor substrate of this kind remains problematic.

This is because the interface formed between the donor layer and the handle substrate is sensitive to the heat treatment. More particularly, this interface can be the site of development of cracks and/or of delamination of the donor layer.

An object of the present invention is thus to propose a process for transferring a working layer to a donor substrate that is able to prevent the development of cracks at the interface formed between the donor layer and the handle substrate and of delamination of the donor layer.

## BRIEF DESCRIPTION OF THE INVENTION

An aspect of the invention provides a process for transferring a working layer onto a support substrate, the process comprising the following steps:

a) providing a donor substrate that comprises, starting from a main face, a donor layer formed from a piezoelectric material and a handle substrate, the donor layer lying on one face of the handle substrate;

b) forming of a weakened zone, through the implantation of species in the donor layer, that is parallel to the main face and that, with the latter, delimits a working layer;

c) joining the support substrate with the donor substrate in such a way as to interpose the donor layer between the handle substrate and the support substrate;

d) subjecting to a heat treatment that comprises, in this order, a first phase and a second phase; the first phase, of a first duration, comprises an increase in temperature to a first

temperature and is designed firstly to allow a maturation of defects, generated by the species, in the weakened zone and secondly to prevent initiation of a fracture in said weakened zone; the second phase, of a second duration, comprises a hold period at a second temperature lower than the first temperature and is designed to initiate a fracture along the weakened zone and thus to transfer the working layer onto the support substrate.

In one embodiment, step d) also comprises a strengthening phase preceding the first phase and performed at a temperature, termed the strengthening temperature, lower than the first temperature, the strengthening phase being intended to strengthen a bonding energy of an interface formed between the support substrate and the donor substrate during the performance of step c).

In one embodiment, the first phase comprises, in this order: an increase in temperature, a hold period at the first temperature, and a decrease in temperature to the second temperature.

In one embodiment, the first phase is adjusted according to the conditions of implantation of the species during the performance of step b).

In one embodiment, the relative difference between the coefficients of thermal expansion of the materials forming respectively the handle substrate and the support substrate is less than 10%.

In one embodiment, the handle substrate comprises a bulk substrate on one face of which lies an intermediate layer, the intermediate layer being interposed between the donor layer and the bulk substrate; advantageously, the intermediate layer comprises a polymeric material.

In one embodiment, the first temperature is less than 300°C, advantageously less than 250°C, even more advantageously less than 220°C.