

CLAIMS

1. Process for preparing a crystalline semiconductor layer so that it has a defined lattice parameter, the process
5 implementing a relaxation sequence comprising:

- forming a strained layer on a start donor substrate;
- transferring at least one portion of the strained layer to a relaxation carrier comprising a flow layer;
- 10 - applying a heat treatment sufficient to relax at least partially the strained layer and provide a relaxed layer on the relaxation carrier;
- attaching the relaxed layer to a base carrier in order to form a second donor substrate;

15 the process being characterized in that the relaxation sequence is applied a first time to a first start donor substrate then repeated, taking the second donor substrate as start donor substrate, a sufficient number of times so that the lattice parameter of the relaxed
20 layer has the defined lattice parameter.

2. Process according to the preceding claim, wherein the first start donor substrate comprises a GaN surface layer.

25 3. Process according to either of the preceding claims, wherein the strained layer is an InGaN layer having a sufficient proportion of indium to be compressively strained during its formation on the start donor substrate.

30 4. Process according to one of the preceding claims, wherein the transferring step of the relaxation sequence comprises bonding the strained layer to the relaxation carrier comprising a flow layer and removing the start donor substrate by laser detachment and/or fracture and/or
35 thinning.

5. Process according to the preceding claim, wherein the start donor substrate is removed after the heat treatment step.

6. Process according to one of the preceding claims, wherein the relaxation sequence comprises processing the strained layer in order to form islands before the relaxation heat treatment step.
7. Process according to the preceding claim, wherein the relaxation sequence comprises a step of forming a relaxed continuous layer by coalescent deposition on the islands after the attachment of the islands to the base carrier.
8. Process according to one of the preceding claims, wherein the attaching step of the relaxation sequence comprises bonding the relaxed layer to the base carrier and removing the relaxation carrier and the flow layer by laser detachment and/or fracture and/or thinning.
9. Process according to one of the preceding claims, wherein the defined lattice parameter is comprised between 3.22 Å and 3.31 Å.