CLAIMS

1. Method of providing a layer of solid electrolyte (111), the method comprising:
- providing a host substrate (100) including a crystalline solid electrolyte layer,
- transferring said crystalline solid electrolyte layer from the host substrate (100) to a receiver substrate (203), wherein the layer transfer technique (S11) comprises a step of assembling (S2) the host substrate (100) to a receiver substrate (203), the solid electrolyte layer being between said substrates, and a step of thinning (S3) the host substrate (100);
characterized by
the step of thinning (S3) comprising a step of formation (S4) of a zone of weakness (320) in the host substrate so as to define a portion of the host substrate comprising the layer to be transferred and a step of detaching (S5) at the zone of weakness (320) so as to transfer said portion to the receiver substrate.

2. Method of providing a layer of solid electrolyte (111) according to one of the preceding claims wherein the layer of solid electrolyte (111) is a monocrystalline layer.

3. Method of providing a layer of solid electrolyte (111) according to one of the claims 1 to 2, characterized in that the host substrate (100) comprises either a bulk substrate (101) of crystalline solid electrolyte material or a donor layer of crystalline solid electrolyte (110) provided on a support substrate (102).

4. Method of providing a layer of solid electrolyte (111) according to claim 3 characterized in that the donor layer of solid electrolyte (110) is provided on the support substrate (102) by a deposition technique, in particular chemical vapor deposition.

5. Method of providing a layer of solid electrolyte (111) according to claim 1 or according to claim 3 or 4 in combination with claim 1, wherein the step of formation (S4) of a zone of weakness (320) is obtained by implantation of atomic and/or ionic species.

6. Method of providing a layer of solid electrolyte (111) according to claim 1 or according to claim 3 or 4 in combination with claim 1, wherein the zone of weakness

(320) comprises a release layer (330) in the host substrate (100), said release layer being activated during the step of detaching (S5) in a way that detaching occurs.

7. Method of providing a layer of solid electrolyte according to claims 5 to 6 wherein the detaching step (S5) is obtained by at least one of: annealing, application of thermal stress, application of mechanic stress, application of irradiative means, in particular a laser beam, and etching.

8. Method of providing a layer of solid electrolyte (111) according to one of the preceding claims wherein the solid electrolyte material has ionic conductivity, in particular for hydrogen, oxygen, lithium or natrium ions, above 0.01 S/cm.

9. Method of providing a layer of solid electrolyte (111) according to one of the preceding claims wherein the layer of solid electrolyte (111) has a thickness in the range of 10 nm up to 100 µm with a variation in thickness below 5%, more preferentially below 1%.

10. Method of providing a layer of solid electrolyte (111) according to one of the preceding claims wherein the layer of solid electrolyte (111) has a defect density below a predetermined level, in particular lower than 5/cm².

11. Method of providing a layer of solid electrolyte (111) according to one of the preceding claims wherein the material of the solid electrolyte layer (111) is a perovskite material and/or is chosen among the group of zirconia, ceria, gallates, alumina.

12. Method of providing a layer of solid electrolyte (11) according to one of the preceding claims wherein after transfer of the solid electrolyte layer onto the receiver substrate, there remains a portion of the host substrate which is further useable as host substrate for a subsequent transfer of a solid electrolyte layer.

13. Method of fabrication of a solid oxide fuel cell comprising an anode, a cathode, a layer of solid electrolyte in between said anode and cathode, and electrodes on the side of the anode and the cathode opposing to the layer of solid electrolyte, comprising carrying out the method according to one of claims 1 to 12 for transferring a crystalline solid electrolyte layer onto the anode and/or the cathode.

14. Method of fabrication of an oxygen sensor comprising two electrodes and a layer of solid electrolyte in between said two electrodes comprising carrying out the method

according to one of claims 1 to 12 for transferring a crystalline solid electrolyte layer onto the anode and/or the cathode.

15. Method of fabrication of a donor structure (701) comprising a donor substrate (700) having a main surface and a plurality of crystalline solid electrolyte layer portions on said main surface, wherein each of the plurality of crystalline electrolyte layer portions is obtained by the method according to one of claims 1 to 12.