Claims

1. A method for manufacturing a device comprising a set of at least two passive optical components, said method comprising:

manufacturing the at least said two passive optical components using embossing with flow control using a tool obtained by carrying out tool manufacturing steps, said tool manufacturing steps comprising:

i) manufacturing a precursor tool having a rotationally symmetric replication surface; and

ii) modifying said replication surface by removing material from said precursor tool such that the obtained replication surface is not rotationally symmetric, and such that an aperture of at least one of said passive optical components is reduced relative to a passive optical component that would be produced using the precursor tool in the absence of said step of modifying.

2. The method according to claim 1, wherein at least one of said passive optical components of said set is a truncated lens.

3. The method according to claim 1, wherein said replication surface of said precursor tool is suitably shaped for manufacturing by replication a precursor passive optical component, wherein from said precursor passive optical component, a passive optical component of said set of passive optical components is obtainable by truncating said precursor passive optical component.

4. The method according to claim 1, comprising carrying out said tool manufacturing steps.

5. The method according to claim 1, wherein said device comprises a set of optical structures each of which comprises a main portion and a surrounding portion at least partially surrounding the respective main portion, wherein each of said main portions is identical with one of said passive optical components of said set of passive optical

components, wherein each of the surrounding portions is distinct from each of the main portions.

6. The method according to claim 5, wherein each of said optical structures forms a unitary part.

7. The method according to claim 5, wherein surrounding portions of at least two of said optical structures are overlapping or partially coinciding.

8. The method according to claim 1, wherein manufacturing the at least two passive optical components comprises carrying out, in the presented order, the following:

r0) providing a substrate;

r11) moving said substrate and said tool towards each other with a first portion of a replication material between them;

r12) hardening said first portion of replication material;

r13) moving said substrate and said tool away from each other, said hardened first portion of replication material remaining in a first location of said substrate;

r21) moving said substrate and said tool towards each other with a second portion of a replication material between them;

r22) hardening said second portion of replication material;

r23) moving said substrate and said tool away from each other, said hardened second portion of replication material remaining in a second location of said substrate, wherein said first location is different from said second location.

9. The method according to claim 8, wherein said hardened first and second portions of replication material are adjacent to each other.

10. The method according to claim 9, wherein said hardened first and second portions of replication material are in direct physical contact with each other.

11. The method according to claim 8, wherein said hardened first portion of replication material comprises a first one of said set of passive optical components and said hardened second portion of replication material comprises a second one of said set of passive optical components.

12. The method according to claim 8, wherein r11) to r23) are carried out a plurality of times, each time in a different region of said substrate.

13. The method according to claim 12, wherein r11) to r13) are carried out in said plurality of different regions of said substrate and subsequently thereto, r21) to r23) are carried out in said plurality of different regions of said substrate.

14. The method according to claim 12, wherein the sequence of r11) to r23) is carried out subsequently in said plurality of different regions of said substrate.

15. The method according to claim 1, wherein said tool manufacturing steps comprise:

i1) manufacturing a first precursor tool having a first replication surface;

i2) manufacturing a second precursor tool having a second replication surface;

ii1) modifying said first replication surface by removing material from said first precursor tool;

ii2) modifying said second replication surface by removing material from said second precursor tool.

16. The method according to claim 15, wherein said tool comprises the so-obtained modified first and second precursor tools.

17. The method according to claim 16, wherein said tool comprises the so-obtained modified first and second precursor tools fixed with respect to each other.

18. The method according to claim 1, wherein said tool manufacturing steps comprise:

— providing one or more masters;

— manufacturing, using replication, said precursor tool using said one or more masters.

19. The method according to claim 18, wherein at least one of:

— said precursor tool is, at least where it forms its replication surface, made of a replication material;

— said precursor tool forms, at least where it forms its replication surface, a contiguous part;

— the replication surface of the precursor tool has a shape describing the negative of at least a portion of a first and of at least a portion of a second passive optical component of said passive optical components of said set.

20. The method according to claim 18, wherein at least one of said one or more masters is of rotational symmetry, at least in the region where it forms its replication surface.

21. The method according to claim 1, wherein said device is at least one of:

— a passive optical component;

— a lens;

— an optical module;

— a multi-channel optical module;

— an opto-electronic module;

— a multi-channel opto-electronic module;

— an optical device;

— a multi-channel optical device;

— a wafer;

— a wafer stack;

— a photographic device;

— a communication device;

— a smart phone;

— a sensor;

— a proximity sensor;

— an ambient light sensor.

22. The method according to claim 1, wherein manufacturing the at least two passive optical components comprises:

manufacturing a master wafer, by replication, using said tool;

manufacturing a replication tool, by replication, using said master wafer; and

manufacturing, by replication using said replication tool, a multitude of sets of at least two passive optical components each, said multitude of sets comprising the before-mentioned set of at least two passive optical components.

23. The method according to claim 1, wherein a first passive optical component and a second passive optical component of the set are distant from one another.

24. The method according to claim 1, wherein the passive optical components of the set are all distant from one another.