Claims

1. A method for manufacturing an electro-optical device, wherein

- a waveguide (3) is provided (S1),
- a planarization coat (7) overlapping at least a section of the waveguide (3) is fabricated (S2),
- the planarization coat (7) is provided with a spin-on-glass coating (9) (S3),
- at least in the region of the spin-on-glass coating (9), an etching treatment is carried out (S4), in the course of which etching is carried out down to the planarization coat (7) and the spin-on-glass coating (9) and part of the planarization coat (7) are removed,
- wherein the steps of providing the planarization coat (7) with the spin-on-glass coating (9) and the etching treatment are carried out at least once (S5, S6), and wherein the single or multiple spin-on-glass coating and subsequent etching treatment is carried out in such a way that the coat thickness of the planarization coat (7) above the waveguide (3) or at least a section thereof is less than or equal to 50 nm, and
- an active element (10) is provided (S7) on or above the planarization coat (7) and above the waveguide (3), wherein the active element (10) comprises at least one material, which absorbs electromagnetic radiation of at least one wavelength and generates an electric photosignal as a result of the absorption and/or whose refractive index changes as a function of at least one of a voltage, a presence of charge(s) and an electric field.

2. The method according to claim 1, **characterized** in that for obtaining an electro-optical modulator (6) as the electro-optical device, the following steps are further performed:

- a dielectric coat (17) is fabricated on the active element (10), and

– on an upper side of the dielectric coat (17) facing away from the active element (10) a further active element (10) is provided,.

3. The method according to claim 1 or 2, **characterized in** that the active element (10) is provided on or above an upper side of the planarization coat (7) by depositing at least one suitable material, or in that the active element (10) is provided on the upper side of the planarization coat (7) by means of a transfer process.

4. The method according to claim 1 or 2, **characterized in** that a film is provided as the active element (10).

5. The method according to claim 1 or 2, **characterized in** that as the at least one material of the active element (10), which absorbs electromagnetic radiation of at least one wavelength and generates an electrical photosignal as a result of the absorption and/or whose refractive index changes as a function of at least one of a voltage, a presence of charge(s) and an electric field, at least one of a group comprising graphene, at least one dichalcogenide, heterostructures of two-dimensional materials, germanium, lithium niobate, at least one electro-optical polymer, silicon and at least one compound semiconductor is used.

6. The method according to any of the preceding claims, **characterized in** that the planarization coat (7) is fabricated by applying coating material at least on or above the section of the waveguide (3) and on regions laterally of the waveguide (3)**.**

7. The method according to any of the preceding claims, **characterized in** that the planarization coat (7) is fabricated by depositing coating material by means of chemical vapor deposition , and/or by means of physical vapor deposition.

8. The method according to any of the preceding claims, **characterized in** that the planarization coat (7) comprises at least one of a group comprising an oxide, a nitride and a polymer.

9. The method according to any of the preceding claims, **characterized** in that the etching treatment is carried out in such a way that the etching rate for the material of the planarization coat (7) is greater or smaller than the etching rate for the spin-on-glass by a maximum of 50%

10. The method according to any of the preceding claims, **characterized in** that the electro-optical device (6) is fabricated on or above a wafer (4) or on or above a chip.

11. An electro-optical device (6) obtained by the method according to any of the preceding claims.

12. A semiconductor apparatus comprising a chip and at least one electro-optical device (6) according to claim 10.

13. A semiconductor device comprising a wafer (4) and at least one electro-optical device (6) according to claim 11.