Claims

1. A monolithic integrated semiconductor structure comprising:
   A) a carrier layer including doped or undoped Si,
   B) a layer having the composition $B_xAl_yGa_zN_tP_v$, wherein
   x=0-0.1, y=0-1, z=0-1, t=0-0.1 and v=0.9-1,
   C) a relaxation layer having the composition $B_xAl_yGa_zIn_uP_vSb_w$, wherein x=0-0.1, y=0-1, z=0-1, u=0-1, v=0-1 and w=0-1, wherein w and/or u is on the side facing toward layer A) or B) smaller than, equal to, or bigger
   than on the side facing away from layer A) or B) and varies or is constant within the relaxation layer, and wherein v=1-w and/or y=1-u-x-z,
   D) an additional semiconductor material, or a combination of different semiconductor materials,
   wherein the sum of stoichiometric indices for all group III elements is equal to 1 and wherein the sum of stoichiometric indices for all group V elements is equal to 1,
   E) a layer for blocking misfit dislocations and having the composition $B_xAl_yGa_zIn_uP_vSb_wN_t$, wherein x=0-0.1, y=0-1, z=0-1, u=0-1, v=0-1, w=0-1 and t=0-0.1,
   and
   F) a layer for hetero-offset having the 10 composition $B_xAl_yGa_zIn_uP_vSb_wN_tAs_r$, wherein x=0-0.1, y=0-1, z=0-1, u=0-1, v=0-1, w=0-1, t=0-0.1 and r=0-1,
   wherein the compositions of layers C), E), and F) are selected such that the lattice constant of one of layers E) and/or F) and/or of the side of layer C) facing away from layer A) or B) substantially corresponds to the lattice constant of layer F).

2. The semiconductor structure according to claim 1, so wherein layer A) on a side facing toward layer B) or C) is a Si 001 surface of a Si monocrystal.

3. The semiconductor structure according to claim 1, wherein layer B) has a thickness of 20-100 nm and a p- or n-doping concentration of $1*10^{15}$-$1*10^{21}$ cm^{-3}.

4. The semiconductor structure according to claim 1 wherein layer B) has a composition selected from the group consisting of:
   z=v=1, x=y=t=0 or
   y=v=1, x=z=t=0 or
   x=0.01-0.1, y=0.90-0.99, z=t=0, v=1 or
   x=0.01-0.1, z=0.90-0.99, y=t=0, v=1 or
   t=0.01-0.1, v=0.90-0.99, y=x=0, z=1.

5. The semiconductor structure according to claim 1, wherein in layer C) w and/or u is on a side facing toward layer A) or B) smaller than on the side facing away from layer A) or B) and in the direction of a location coordinate that is orthogonal to main faces of the

layer C) passes a maximum, wherein w and/or u in the maximum may be larger than on the side facing away from layer A) or B).

6. The semiconductor structure according to claim 1, wherein layer C) includes a plurality of partial layers, wherein w and/or u is variable or constant within a partial layer.

7. The semiconductor structure according to claim 1, wherein layer C) has a thickness of 1-500 nm and has a p-or n-doping concentration of $1*10^{15}$-$1*10^{21}$ cm^{-3}.

8. The semiconductor structure according to claim 1, wherein layer C) or partial layers thereof have a composition selected from the group consisting of:
y=1, x=z=u=0, v=1-w and
x=z=0, y=1-u, v+w=1.

9. The semiconductor structure according to claim 1, wherein layer E) has a thickness of 1-150 nm and is undoped and/or has a p- or n-doping concentration of $1*10^{15}$-$1*10^{21}$ cm^{-3}.

10. The semiconductor structure according to claim 1, wherein layer E) includes 1-10 layers.

11. The semiconductor structure according to claim 1, wherein layer E) or the partial layers thereof has a composition selected from the group consisting of:
x=0-0.1, y=0.9-1, v=0-0.7, w=0.3-1, z=u=t=0 or
u=1, w=0-0.5, v=0.5-1, t=0-0.1, x=y=z=0 or y=1, v=0-0.7, w=0.3-1, t=0-0.1, x=z=u=0 or u=0.9-1, x=0-0.1, v=0.5-1, w=0-0.5, y=z=t=0.

12. The semiconductor structure according to claim 1, wherein the additional semiconductor material is a group III/V material.

13. The semiconductor structure according to claim 1, wherein layer F) has a thickness of 5-200 nm and is undoped and/or has a p- or n-doping concentration of $1*10^{15}$-$1*10^{21}$ cm^{-3}.

14. The semiconductor structure according to claim 1, wherein layer F) includes 2-5 layers.

15. The semiconductor structure according to claim 1, wherein layer F) has a composition selected from the group consisting of:
y=1, v=0.2-0.5, w=0.5-0.8, x=z=u=t=r=0 or
y=1, w=0.4-0.8, r=0.2-0.6, x=z=u=v=t=0.