1. Method for fabricating a semiconductor structure comprising a monocrystalline semiconductor layer (5) and a metallic layer (7), the method comprising the steps of:

   a) providing a monocrystalline semiconductor layer (5) comprising dislocations (11a, 11b, 11c),

   b) removing material at one or more locations of the dislocations (11a, 11b, 11c) thereby forming pits (13a, 13b, 13c) in the monocrystalline semiconductor layer (5),

   c) passivating the pits (13a, 13b, 13c), and

   d) providing the metallic layer (7) over the monocrystalline semiconductor layer (5).

2. The method according to claim 1, wherein the passivating step c) includes a step of at least partially filing the pits with a dielectric material (15).

3. The method according to claim 1 or 2, wherein the material removal step b) comprises a step of etching the surface of the monocrystalline semiconductor layer (5) preferentially at one or more locations of the dislocations (11a, 11b, 11c).

4. The method according to claim 2 or 3, wherein the dielectric material (15) is chosen from any one of silicon oxide, silicon nitride and mixtures thereof.

5. The method according to any one of claims 2 to 4, wherein the dielectric material (15) completely fills the pits (13a, 13b, 13c) formed in step b).

6. The method according to any one of claims 1 to 5, further comprising a step e) of polishing the surface of the monocrystalline semiconductor layer (5) after step c) and before step d).

7. The method according to any one of claims 1 to 6, wherein the metallic layer is provided by any one of physical vapor deposition (PVD), sputtering and chemical vapor deposition.

8. The method according to claim 7, wherein the monocrystalline semiconductor layer (5) is chosen from any one of GaN, Silicon, strained Silicon, Germanium, SiGe or a III-V material, III/N material, binary or ternary or quaternary alloy like GaN, InGaN, AlGaN, AlGaInN and the likes and the metallic layer is chosen from any one of Al, Au, Pt, chromium, palladium, tungsten, molybdenum or silicides from the same, polycrystalline or amorphous material and alloys or combinations thereof.

9. A semiconductor structure comprising a monocrystalline semiconductor layer (5) and a metallic layer (7) provided over the monocrystalline semiconductor layer (5),

wherein pits at least partially filed with a dielectric material (15) are arranged in the monocrystalline semiconductor layer (5) on top of dislocations in the monocrystalline semiconductor layer.

10. The semiconductor structure according to claim 9, wherein the metallic layer (7) is provided on the monocrystalline semiconductor layer (5) and the pits extend up to the interface with the metallic layer (7).

11. The semiconductor structure according to claim 9 or 10, wherein the dielectric material (15) is chosen from any one of silicon oxide, silicon nitride and mixtures thereof.

12. The semiconductor structure according to any one of claims 9 to 11, wherein the pits are completely filed with the dielectric material (15).

13. A device using the semiconductor structure of any one of claims 9 to 12, in particular a Schottky diode.

CLAIMS

1. Method for fabricating a semiconductor structure comprising a monocrystalline semiconductor layer (5) and a metallic layer (7), the method comprising the steps of:

   a) providing a monocrystalline semiconductor layer (5) comprising dislocations (11a, 11b, 11c),

   b) removing material at one or more locations of the dislocations (11a, 11b, 11c) thereby forming pits (13a, 13b, 13c) in the monocrystalline semiconductor layer (5),

   c) passivating the pits (13a, 13b, 13c), and

   d) providing the metallic layer (7) over the monocrystalline semiconductor layer (5),

   wherein the passivating step c) includes a step of completely filling the pits (13a, 13b, 13c) formed in step b) with a dielectric material (15) such that intact portions of the surface of the semiconductor layer (5) away from the pits (13a, 13b, 13c) are exposed.

2. The method according to claim 1, wherein the material removal step b) comprises a step of etching the surface of the monocrystalline semiconductor layer (5) preferentially at one or more locations of the dislocations (11a, 11b, 11c).

3. The method according to claim 1 or 2, wherein the dielectric material (15) is chosen from any one of silicon oxide, silicon nitride and mixtures thereof.

4. The method according to any one of claims 1 to 3, further comprising a step e) of polishing the surface of the monocrystalline semiconductor layer (5) after step c) and before step d).

5. The method according to any one of claims 1 to 4, wherein the metallic layer is provided by any one of physical vapor deposition (PVD), sputtering and chemical vapor deposition.

6. The method according to claim 5, wherein the monocrystalline semiconductor layer (5) is chosen from any one of GaN, Silicon, strained Silicon, Germanium, SiGe or a III-V material, III/N material, binary or ternary or quaternary alloy like GaN, InGaN, AlGaN, AlGaInN and the likes and the metallic layer is chosen from any one of Al, Au, Pt, chromium, palladium, tungsten, molybdenum or silicides from the same, polycrystalline or amorphous material and alloys or combinations thereof.

7. A semiconductor structure comprising a monocrystalline semiconductor layer (5) and a metallic layer (7) provided over the monocrystalline semiconductor layer (5),

   wherein pits completely filled with a dielectric material (15) are arranged in the monocrystalline semiconductor layer (5) on top of dislocations in the monocrystalline semiconductor layer such that intact portions of the surface of the semiconductor layer (5) away from the pits (13a, 13b, 13c) are exposed.

8. The semiconductor structure according to claim 7, wherein the metallic layer (7) is provided on the monocrystalline semiconductor layer (5) and the pits extend up to the interface with the metallic layer (7).

9. The semiconductor structure according to claim 7 or 8, wherein the dielectric material (15) is chosen from any one of silicon oxide, silicon nitride and mixtures thereof.

10. A device using the semiconductor structure of any one of claims 7 to 9, in particular a Schottky diode.