Claims

1. A method (100) for depositing one or more polycrystalline silicon layers on a substrate by a chemical vapour deposition in a reactor, the method comprises

adjusting (140) a deposition temperature between 605°C-800°C in a process chamber of the reactor, and

depositing (150) the one or more polycrystalline silicon layers on the substrate by using a silicon source gas comprising SiH_4 or SiH_2Cl_2, and a dopant gas comprising BCl_3.

2. The method of claim 1, wherein the method further comprises adjusting (140) a deposition pressure below 200 mtorr in the process chamber.

3. The method of claim 1 or 2, wherein the dopant gas comprises a mixture of BCl_3 and another gas comprising He, Ar, N_2, or H_2.

4. The method of any of the preceding claims, wherein the method comprises depositing the one or more polycrystalline silicon layers on the substrate in the adjusted deposition temperature and the deposition pressure between 160 mtorr-170 mtorr by using SiH_4 as a silicon source gas.

5. The method of any of the preceding claims, wherein the reactor is a horizontal hot-wall reactor, and at least one polycrystalline silicon layer is deposited in the deposition temperature between 605°C-650°C and at least one polycrystalline silicon layer is deposited in the deposition temperature between 650°C-750°C.

6. The method of any of claims 1-4, wherein the reactor is a vertical reactor and at least one polycrystalline silicon layer is deposited in the deposition temperature between 605°C-650°C and at least one polycrystalline silicon layer is deposited in the deposition temperature between 650°C-750°C.

7. The method of any of the preceding claims, wherein the substrate comprises a recess extending part-way through the substrate, a trench, a hole extending completely through the substrate, or a protrusion extending from a surface of the substrate, and the one or more polycrystalline silicon layers are deposited inside the recess, trench, or hole, or on the protrusion.

8. The method of any of the preceding claims, wherein the substrate comprises at least an insulating surface layer.

9. A semiconductor structure (200) comprising a substrate (210) and one or more polycrystalline silicon layers (230a, 230b, 230c) on the substrate that is provided by the method of any of claims 1-8.

10. An apparatus (500) comprising the semiconductor structure of claim 9.

Claims

1. A method (100) for forming a through-wafer-via through a substrate (210) by a chemical vapour deposition in a reactor,

the substrate comprises a trench (222), a recess (224) extending part-way through the substrate, or a hole (226) extending completely through the substrate, the method comprising

adjusting (140) a deposition temperature between 605°C-800°C and a deposition pressure below 0,27 mbar in a process chamber of the reactor, and

depositing (150) one or more polycrystalline silicon layers (230a, 230b, 230c) inside the recess, trench, or hole by using a silicon source gas comprising SiH_4 or SiH_2Cl_2, and a dopant gas comprising BCl_3 for enabling to form the through-wafer-via.

2. The method of claim 1, wherein the dopant gas comprises a mixture of BCl_3 and another gas comprising He, Ar, N_2, or H_2.

3. The method of any of the preceding claims, wherein the method comprises depositing the one or more polycrystalline silicon layers on the substrate in the adjusted deposition temperature and the deposition pressure between 0,21 mbar-0,23 mbar by using SiH_4 as a silicon source gas.

4. The method of any of the preceding claims, wherein the reactor is a horizontal hot-wall reactor, and at least one polycrystalline silicon layer is deposited in the deposition temperature between 605°C-650°C and at least one polycrystalline silicon layer is deposited in the deposition temperature between 650°C-750°C.

5. The method of any of claims 1-3, wherein the reactor is a vertical reactor and at least one polycrystalline silicon layer is deposited in the deposition temperature between 605°C-650°C and at least one polycrystalline silicon layer is deposited in the deposition temperature between 650°C-750°C.

6. The method of any of the preceding claims, wherein the substrate further comprises a protrusion extending from a surface of the substrate, and the one or more polycrystalline silicon layers are deposited on the protrusion.

7. The method of any of the preceding claims, wherein the substrate comprises at least an insulating surface layer.

8. A semiconductor structure (200) comprising a substrate (210), which comprises a trench (222), a recess (224) extending part-way through the substrate, or a hole (226) extending completely through the substrate, and one or more polycrystalline

silicon layers (230a, 230b, 230c) inside the trench, recess, or hole that is provided by the method of any of claims 1-7.

9. An apparatus (500) comprising the semiconductor structure of claim 8.