Claims

[Claim 1] A method of processing a substrate (1),
providing a substrate (1) that displays out-gassing when placed in a vacuum,
placing the substrate (1) in a vacuum,
performing an out-gassing treatment by heating the substrate (1) to a temperature T1 and removing gaseous contamination emitted from the substrate (1) until the out-gassing rate is determined by the diffusion of the substrate's contamination and thus essentially a steady state has been established, and afterwards
lowering the temperature to a temperature T2 at which the diffusion rate of the substrate's contamination is lower than at T1,
further processing the substrate (1) at said temperature T2, said further processing including depositing a film comprising a metal (16) onto the substrate (1) until the
substrate (1) has been covered with the film.

[Claim 2] The method according to claim 1, wherein the difference between T1 and T2 is at least 100K.

[Claim 3] The method according to claim 1 or claim 2, wherein
the substrate (1) is maintained at a temperature of T2 or less during the further processing of the substrate (1).

[Claim 4] The method according to one of claims 1 to 3, wherein
the further processing of the substrate (1) comprises one or more of etching the substrate (1) and depositing one or more metal layers (16) onto the substrate (1).

[Claim 5] The method according to one of claims 1 to 4, wherein
the substrate (30) is a semiconductor wafer (31) comprising a layer (32) of organic material.

[Claim 6] The method according to claim 5, wherein
the organic material (32) comprises a polyimide layer arranged on the front surface of the semiconductor wafer (31).

[Claim 7] The method according to claim 5 or claim 6, wherein
the semiconductor wafer (31) is a silicon wafer.

[Claim 8] The method according to one of claims 1 to 7, wherein
at least portions of one or more of the front side and the rear side of the substrate (1) comprise organic material (3).

[Claim 9] The method according to one of claims 1 to 8, further comprising trapping gaseous matter emitted from the substrate (1) in a cold trap positioned in a pumping line.

[Claim 10] The method according to one of claims 1 to 9, further comprising monitoring the gaseous matter removed from the substrate (1) and identifying presence of one or more of the compounds CO_2, H_2O, C_xH_y.

[Claim 11] The method according to one of claims 1 to 10, further comprising, before depositing the first metal layer (16), carrying out a cleaning treatment at a temperature T2.

[Claim 12] The method according to claim 11, wherein the cleaning treatment is an etching treatment.

[Claim 13] The method according to claim 11 or 12, further comprising actively cooling the substrate (1) during the cleaning treatment.

[Claim 14] The method according to one of claims 1 to 13, further comprising actively cooling the substrate (1) during deposition of the first metal layer (16).

[Claim 15] The method according to one of claims 1 to 14, further comprising depositing a second metal layer (17) on the first metal layer (16) and, optionally, a third metal layer on the second metal layer (17).

[Claim 16] The method according to one of claims 1 to 15, further comprising depositing a sealing metal layer (43) on the rear side of the substrate (1) before depositing the first metal layer (16) on the front side of the substrate (1).

[Claim 17] A method of producing an electronic component, comprising performing the method of one of claims 1 to 16, and singulating the substrate (1) to produce one or more electronic components, the electronic component comprising a semiconductor chip (2) embedded in a plastic composition (3) and at least one metal layer (7) positioned on at least one of the semiconductor chip (2) and on the plastic composition (3).

[Claim 18] Apparatus for processing a substrate (1), comprising two out-gassing stations and at least one processing station, wherein
a first out-gassing station comprises an airlock comprising means for heating the substrate (1), a process monitoring sensor, the airlock being coupled to an evacuation system,
a second out-gassing station comprises means for heating the substrate, a gas supply positioned to purge a back side of the substrate, a process monitor sensor, the second out-gassing station being coupled to an evacuation system, and
at least one subsequent processing station comprises means to actively cool the substrate (1),
wherein the first out-gassing station is the in-bound airlock of a cluster-type multi-station processing apparatus.

[Claim 19] The apparatus according to claim 18, wherein the means for cooling the substrate (1) is a cryogenic chuck comprising a heater element.

[Claim 20] The apparatus according to claim 18 or claim 19, wherein the out-gassing stations and the processing stations comprise receiving pins arranged to receive a circularly bowed substrate (1).

[Claim 21] The apparatus according to one of claims 18 to 20, wherein one or more of the out-gassing stations and the processing stations comprise a cold trap to getter gaseous matter emitted from the substrate (1).

[Claim 22] The apparatus according to one of claims 18 to 21, wherein the second out-gassing station and/or the subsequent processing station further comprise a gas line for the supply of oxygen to the station and an RF power supply to a chuck of the second out-gassing station for in-situ cleaning.