CLAIMS

[Claim 1]

An apparatus for manufacturing a group III nitride substrate, comprising:

two or more rotating susceptors for holding and rotating a seed crystal in a reaction container;

a heating means for heating the seed crystal;

a revolving susceptor for placing thereon and revolving the two or more rotating susceptors;

a concentric multiplex tube in which a first gas ejection port is surrounded by a third gas ejection port, and a third gas ejection port is surrounded by a second gas ejection port and

an exhaust means for exhausting gas,

wherein the first gas ejection port ejects a gas of a chloride of a group III element at a predetermined angle with respect to the direction of the axis of rotation of the revolving susceptor, a second gas ejection port ejects a nitrogen-containing gas at the predetermined angle with respect to the direction of the axis of rotation of the revolving susceptor, and the third gas ejection port ejects an inert gas from between the first gas ejection port and the second gas ejection port and at the predetermined angle with respect to the direction of the axis of rotation of the revolving susceptor,

wherein the predetermined angle is selected from the range of not less than 5° and not more than 85°.

[Claim 2]

The apparatus for manufacturing a group III nitride substrate according to claim 1, wherein the inner wall of the reaction container is covered with a material which does not react with the gases ejected from the first gas ejection port, the second gas ejection port and the third gas ejection port, or with a reaction product of these gases.

[Claim 3]

The apparatus for manufacturing a group III nitride substrate according to claim 1 or 2, further comprising a pressure adjustment means for adjusting the pressure in the reaction container to a negative pressure lower than atmospheric pressure.

[Claim 4]

A method for manufacturing a group III nitride substrate, comprising:

holding a seed crystal on a rotating susceptor rotating in a reaction container;

heating the seed crystal with a heating means;

placing the rotating susceptor on a revolving susceptor, and rotating two or more of the revolving susceptor;

ejecting a gas of a chloride of a group III element,–a nitrogen-containing gas, and an inert gas from a concentric multiplex tube in which a first gas ejection port is surrounded by a third gas ejection port, and a third gas ejection port is surrounded by a second gas ejection port, at the predetermined angle with respect to the direction of the axis of rotation of the revolving susceptor; and

exhausting gas with an exhaust means,

wherein the first gas ejection port ejects the gas of a chloride of a group III element at a predetermined angle with respect to the direction of the axis of rotation of the revolving susceptor, a second gas ejection port ejects the nitrogen-containing gas at the predetermined angle with respect to the direction of the axis of rotation of the revolving susceptor, and the third gas ejection port ejects the inert gas from between the first gas ejection port and the second gas ejection port and at the predetermined angle with respect to the direction of the axis of rotation of the revolving susceptor,

wherein the predetermined angle is selected from the range of not less than 5° and not more than 85°.

[Claim 5]

The method for manufacturing a group III nitride substrate according to claim 4, further comprising adjusting the pressure in the reaction container to a negative pressure lower than atmospheric pressure by using a pressure adjustment means.

[Claim 6]

The method for manufacturing a group III nitride substrate according to claim 4 or 5, wherein the group III nitride is gallium nitride,

wherein the seed crystal is a SCAM substrate, or a gallium nitride substrate produced by a method selected from a MOCVD method, a Na flux method, a liquid ammonia method, and a hydride vapor phase epitaxy method,

wherein the gas of a chloride of a group III element is gallium trichloride or gallium chloride,

wherein the nitrogen-containing gas is ammonia, and

wherein the inert gas is argon or nitrogen.