CLAIMS

1. A method for producing bromine pentafluoride, comprising:

a reaction step of feeding a bromine-containing compound, the bromine-containing compound being at least one of a bromine gas and bromine trifluoride, and a fluorine gas to a reactor to give a (fluorine atom):(bromine atom) molar ratio, that is, F/Br of 3.0 or more and 4.7 or less and reacting the bromine-containing compound and the fluorine gas to each other to obtain a reaction mixture containing bromine pentafluoride and bromine trifluoride; and

a separation step of separating bromine pentafluoride and bromine trifluoride in the reaction mixture from each other;

wherein the separation step includes a cooling step of cooling and separating the reaction mixture into a gas component containing bromine pentafluoride and a liquid-solid component containing bromine trifluoride;

wherein the separation step further includes an adsorption step of bringing the gas component containing bromine pentafluoride obtained by the cooling step into contact with an adsorbent and allowing bromine trifluoride mixed in the gas component containing bromine pentafluoride to be adsorbed by the adsorbent, wherein the adsorbent is sodium fluoride.

2. The method for producing bromine pentafluoride according to Claim 1, wherein in the reaction step, an inert gas is fed to the reactor along with the bromine-containing compound and the fluorine gas to perform the reaction and the inert gas is fed in an amount of 50 vol%

or more relative to the total gas volume of the bromine-containing compound, the fluorine gas and the inert gas.

3. The method for producing bromine pentafluoride according to Claim 1 or 2, wherein the reaction is performed at a pressure of 0.1 MPa or more and 0.5 MPa or less.

4. The method for producing bromine pentafluoride according to any one of Claims 1 to 3, wherein the reaction is performed at a temperature of 100°C or more and 400°C or less.

5. The method for producing bromine pentafluoride according to any one of Claims 1 to 4, wherein the reaction is performed by placing at least one of an oxide of a metal and a fluoride of a metal as a catalyst in the reactor and the metal is at least one of metals belonging to the Group III elements and the Group IV elements in a periodic table.

6. The method for producing bromine pentafluoride according to Claim 5, wherein the catalyst is at least one selected from Al_2O_3, NiF_2, FeF_3, CoF_2, and AlF_3.

7. The method for producing bromine pentafluoride according to any one of Claims 1 to 6, wherein the reactor is a bright annealing tube made of nickel.

~~8. The method for producing bromine pentafluoride according to any one of Claims 1 to 7, wherein the separation step includes a cooling step of cooling and separating the reaction mixture into a gas component~~

containing bromine pentafluoride and a liquid-solid component containing bromine trifluoride.

9. The method for producing bromine pentafluoride according to Claim 8, wherein the separation step further includes an adsorption step of bringing the gas component containing bromine pentafluoride obtained by the cooling step into contact with an adsorbent and allowing bromine trifluoride mixed in the gas component containing bromine pentafluoride to be adsorbed by the adsorbent.

10. The method for producing bromine pentafluoride according to Claim 9, wherein the adsorbent is a fluoride of at least one of metals belonging to the Group I elements and the Group II elements in the periodic table.

11. The method for producing bromine pentafluoride according to Claim 9, wherein the adsorbent is at least one selected from LiF, NaF, KF, RbF, CsF, MgF_2, and CaF_2.