DESCRIPTION

Title of Invention: DEHYDRATION METHOD FOR FLUORINE-BASED HYDROCARBON COMPOUND

Technical Field

[0001]

The present disclosure relates to a method for dehydrating a fluorine-based hydrocarbon compound.

Background Art

[0002]

Fluorine-based hydrocarbon compounds such as difluoromethane (HFC-32) are widely used in etching gas in the semiconductor production process.

[0003]

Fluorine-based hydrocarbon compounds such as HFC-32 have been conventionally subjected to water adsorption by using a zeolite A to dehydrate the compounds (e.g., PTL 1).

Citation List

Patent Literature

[0004]

PTL 1: Patent No. 5446710

Summary

Technical Problem

[0005]

An object of the present disclosure is to provide a method for dehydrating a composition containing a fluorine-based hydrocarbon compound such as HFC-134a.

Solution to Problem

[0006]

The present disclosure includes the following subject matter.

contains at least one compound selected from the group consisting of 1,1,1,2-tetrafluoroethane (HFC-134a), 1,1,1,2,2-pentafluoroethane (HFC-125), difluoromethane (HFC-32), and 2,3,3,3-tetrafluoropropene (HFO-1234yf), and

wherein the moisture content is less than 3 ppmwt or/and the HFC-134 content is less than 3 ppmwt.

[0024]

Item 14.

The composition according to Item 13, which is for use in etching gas, refrigerants, heat-transfer mediums, deposit gas, building blocks for organic synthesis, or cleaning gas.

Advantageous Effects of Disclosure

[0025]

The present disclosure provides a method for dehydrating a composition containing a fluorine-based hydrocarbon compound, such as HFC-134a.

[0025a]

Thus, in one aspect, the present disclosure provides a method for dehydrating a composition containing a fluorine-based hydrocarbon compound,

wherein the fluorine-based hydrocarbon compound contains 1,1,1,2-tetrafluoroethane (HFC-134a),

the method comprising the step of bringing the composition containing the fluorine-based hydrocarbon compound into contact with a zeolite having a ratio of silica to alumina (SiO_2/Al_2O_3) of 5 or more.

[0025b]

In another aspect, the present disclosure provides a method for dehydrating a composition containing a fluorine-based hydrocarbon compound,

wherein the fluorine-based hydrocarbon compound contains 1,1,1,2-tetrafluoroethane (HFC-134a),

the method comprising the step of bringing the composition containing the fluorine-based hydrocarbon compound into contact with at least one zeolite selected from the group consisting of chabazite zeolite, mordenite zeolite, beta zeolite, and zeolite Y.

[0025c]

In another aspect, the present disclosure provides a method for producing a composition containing a fluorine-based hydrocarbon compound,

wherein the fluorine-based hydrocarbon compound contains 1,1,1,2-tetrafluoroethane (HFC-134a),

the method comprising the step of bringing a composition containing the fluorine-based hydrocarbon compound into contact with a zeolite having a ratio of silica to alumina (SiO_2/Al_2O_3) of 5 or more.

[0025d]

In another aspect, the present disclosure provides a method for producing a composition containing a fluorine-based hydrocarbon compound,

wherein the fluorine-based hydrocarbon compound contains 1,1,1,2-tetrafluoroethane (HFC-134a),

the method comprising the step of bringing a composition containing the fluorine-based hydrocarbon compound into contact with at least one zeolite selected from the group consisting of chabazite zeolite, mordenite zeolite, beta zeolite, and zeolite Y.

[0025e]

In another aspect, the present disclosure provides a method for producing a high-purity fluorine-based hydrocarbon compound, the method comprising the step of bringing a

composition containing a fluorine-based hydrocarbon compound containing 1,1,1,2-tetrafluoroethane (HFC-134a) into contact with a zeolite having a ratio of silica to alumina (SiO_2/Al_2O_3) of 5 or more to remove an impurity contained in the fluorine-based hydrocarbon compound.

[0025f]

In another aspect, the present disclosure provides a method for producing a high-purity fluorine-based hydrocarbon compound, the method comprising the step of bringing a composition containing a fluorine-based hydrocarbon compound containing 1,1,1,2-tetrafluoroethane (HFC-134a) into contact with at least one zeolite selected from the group consisting of chabazite zeolite, mordenite zeolite, beta zeolite, and zeolite Y to remove an impurity contained in the fluorine-based hydrocarbon compound.

[0025g]

In another aspect, the present disclosure provides a composition containing a fluorine-based hydrocarbon compound,

wherein the fluorine-based hydrocarbon compound contains at least one compound selected from the group consisting of 1,1,1,2-tetrafluoroethane (HFC-134a), 1,1,1,2,2-pentafluoroethane (HFC-125), and 2,3,3,3-tetrafluoropropene (HFO-1234yf), and

wherein the HFC-134 content is at least 0.1 ppmwt, and less than 3 ppmwt.

Description of Embodiments

[0026]

It is important to remove moisture from etching gas in the semiconductor production process.

[0027]

The present inventors conducted extensive research and found that in dehydrating a composition containing a fluorine-based hydrocarbon compound, such as HFC-134a, if the composition containing a fluorine-based hydrocarbon compound, such as HFC-134a, is brought into contact with a zeolite having a molar ratio of silica to alumina (SiO_2/Al_2O_3) of 5 or more, or brought into contact with chabazite zeolite, the release of the moisture adsorbed by the zeolite from the zeolite is suppressed even after the dehydration treatment time is passed, and moisture is well removed (dehydrated) from the composition containing the fluorine-based hydrocarbon compound, such HFC-134a.

[0028]