DESCRIPTION

Title of Invention: METHOD FOR PRODUCING COMPOSITION CONTAINING PURIFIED FLUORINE-CONTAINING ETHER COMPOUND

Technical Field

[0001]

The present disclosure relates to a method for producing a composition comprising a purified fluorine-containing ether compound.

Background Art

[0002]

In recent years, hydrofluoroethers (HFEs), which have a low global warming potential (GWP) and ozone depletion potential (ODP), and low toxicity, are attracting attention as alternatives to chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs).

[0003]

NPL 1 discloses that 1,1,2,3,3,3-hexafluoropropyl methyl ether (HFE-356mec), a kind of HFE, can be obtained by reacting hexafluoropropene (HFP) with methanol in the presence of alkali.

Citation List

Non-patent Literature

[0004]

NPL 1: Green Chemistry, 2002, 4, 60-63

Summary

Technical Problem

[0005]

An object of the present disclosure is to provide a method for producing a composition comprising a purified fluorine-containing ether compound represented by formula (1): $CHX^1X^2CF_2OX^3$, wherein X^1 and X^2 are the same or different and each

The production method according to Item 1 or 2, wherein in the step (A), the reaction is performed in a liquid phase.

Item 4.

The production method according to any one of Items 1 to 3, wherein in the step (B), the composition obtained in the step (A) is rectified in a rectification column to separate the halogen adduct and/or oxide from the composition obtained in the step (A).

Item 5.

The production method according to any one of Items 1 to 4, wherein the fluorine-containing ether compound represented by the formula (1) is 1,1,2,3,3,3-hexafluoropropyl methyl ether (HFE-356mec).

Item 6.

The production method according to any one of Items 1 to 5, wherein the fluorine-containing olefin compound represented by the formula (2) is $CF_3CF=CFOCH_3$ and/or $CF_2=CFCF_2OCH_3$.

Item 7.

A composition comprising

1,1,2,3,3,3-hexafluoropropyl methyl ether (HFE-356mec), and $CF_3CF=CFOCH_3$ and/or $CF_2=CFCF_2OCH_3$.

Item 8.

The composition according to Item 7, wherein the total content of $CF_3CF=CFOCH_3$ and $CF_2=CFCF_2OCH_3$ is 0.1 mass% or less based on HFE-356mec.

Item 9.

The composition according to Item 7 or 8, wherein the composition further comprises hydrogen fluoride, and wherein the content of the hydrogen fluoride is 0.01 mass% or less based on HFE-356mec.

[0006a]

In one aspect, there is provided a method for producing a composition comprising a purified fluorine-containing ether compound,

the method comprising:

(A) reacting, in the presence of a fluorine-containing ether compound represented by formula (1): $CHX^1X^2CF_2OX^3$, wherein X^1 and X^2 are the same or different and each represents a hydrogen atom, a fluorine atom, or a trifluoromethyl group, and X^3 represents a C_{1-6} alkyl group, provided that not both X^1 and X^2 are trifluoromethyl groups, a fluorine-containing olefin compound represented by formula(2): $CX^1X^2=CF(CF_2)_nOX^3$, wherein n represents 0 or 1, and X^1, X^2, and X^3 are as defined above, provided that when X^1 or X^2 is a trifluoromethyl group, n is 0, and not both X^1 and X^2 are trifluoromethyl groups, with a halogenating agent and/or oxidant to convert the fluorine-containing olefin compound represented by the formula (2) to a halogen adduct and/or oxide, thereby obtaining a composition comprising the fluorine-containing ether compound represented by the formula (1) and the halogen adduct and/or oxide; and

(B) separating the halogen adduct and/or oxide from the composition obtained in the step (A) to obtain a composition comprising a purified fluorine-containing ether compound.

[0006b]

In another aspect, there is provided a composition comprising

1,1,2,3,3,3-hexafluoropropyl methyl ether (HFE-356mec), and

$CF_3CF=CFOCH_3$ and/or $CF_2=CFCF_2OCH_3$,

wherein the total content of $CF_3CF=CFOCH_3$ and $CF_2=CFCF_2OCH_3$ is 0.00001 mass% or more and 0.1 mass% or less based on HFE-356mec.

Advantageous Effects of Invention

[0007]

According to the production method of the present disclosure, a composition comprising a purified fluorine-