DESCRIPTION

Title of Invention: METHOD FOR PRODUCING FLUOROALKYNE COMPOUND

Technical Field

[0001]

The present disclosure relates to a method for producing a fluoroalkyne compound.

Background Art

[0002]

Fluoroalkyne compounds are expected to be useable as cleaning gases, etching gases, refrigerants, heat transfer media, building blocks for organic synthesis, etc.

[0003]

As an example of a method for producing a fluoroalkyne compound, Non-patent Literature (NPL) 1 discloses that a fluoroalkyne compound is obtained from a fluoroalkane compound by a dehydrofluorination reaction, using a base such as lithium diisopropylamide (LDA).

Citation List

Non-patent Literature

[0004]

NPL 1: Tetrahedron, 1988, vol. 44, No. 10, p. 2865-2874

Summary

Technical Problem

[0005]

An object of the present disclosure is to provide a method for efficiently synthesizing a fluoroalkyne compound from a fluoroalkane compound.

Solution to Problem

[0006]

The present disclosure includes the following subject

to 75.00 mol%, and the total content of the fluoroalkyne compound and the fluoroalkene compound being 90.00 to 100.00 mol%, based on the total amount of the composition taken as 100 mol%.

[0019]

Item 13. The composition according to Item 12, which is for use as a cleaning gas, an etching gas, a refrigerant, a heat transfer medium, or a building block for organic synthesis.

[0020]

Item 14. Use of the composition according to Item 12 for a cleaning gas, an etching gas, a refrigerant, a heat transfer medium, or a building block for organic synthesis.

[0020a]

In one aspect, there is provided a method for producing fluoroalkyne compound represented by formula (1):

$R^1C{\equiv}CR^2$ (1)

wherein R^1 and R^2 are the same or different and each is a fluorine atom or a fluoroalkyl group,

the method comprising subjecting a fluoroalkane compound represented by formula (2):

$R^1CHX^1CFX^2R^2$ (2)

wherein R^1 and R^2 are as defined above; and X^1 is a fluorine atom and X^2 is a hydrogen atom, or X^1 is a hydrogen atom and X^2 is a fluorine atom, to a dehydrofluorination reaction in the presence of a solvent containing an ether, and a base comprising a hydroxide and/or alkoxide of an alkali metal and/or alkaline earth metal,

the method satisfying at least one requirement selected from the group consisting of the following:

(I) the fluoroalkyl group is a C_1-C_4 fluoroalkyl group, and

(II) the ether is a chain ether.

[0020b]

In another aspect, there is provided a composition comprising a fluoroalkyne compound represented by formula (1):

$R^1C{\equiv}CR^2$ (1)

wherein R^1 and R^2 are the same or different and each is a C_1-C_4

fluoroalkyl group, and a fluoroalkene compound represented by formula (4):

$R^1CF=CHR^2$ (4)

wherein R^1 and R^2 are as defined above,

the content of the fluoroalkyne compound represented by formula (1) being 25.00 to 75.00 mol%, the content of the fluoroalkene compound represented by formula (4) being 25.00 to 75.00 mol%, and the total content of the fluoroalkyne compound represented by formula (1) and the fluoroalkene compound represented by formula (4) being 90.00 to 100.00 mol%, based on the total amount of the composition taken as 100 mol%.

Advantageous Effects of Invention

[0021]

The present disclosure provides a method for efficiently synthesizing a fluoroalkyne compound from a fluoroalkane compound.

Description of Embodiments

[0022]

In the present specification, the terms “comprise,” “contain,” and “include” encompass the concepts of comprising, consisting essentially of, and consisting of. In the present specification, a numerical range indicated by “A to B” means A or more, and B or less.

[0023]

In the present disclosure, “selectivity” refers to the ratio (mol%) of the total molar amount of the target compound contained in a gas flowing out from a reactor outlet to the total molar amount of the compounds other than the starting compound in the gas flowing out from the reactor outlet.

[0024]

In the present disclosure, “conversion” refers to the ratio (mol%) of the total molar amount of the compounds other than the starting compound contained in a gas flowing out from a