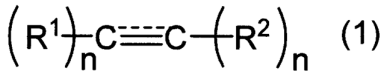
CLAIMS

[Claim 1]

A method for producing a perfluorocarbon compound represented by formula (1):



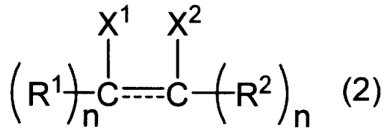
wherein

a bond indicated by a double line and a dotted line is a double bond or a triple bond,

if the bond indicated by the double line and the dotted line is a double bond, both ns represent 2, and if the bond indicated by the double line and the dotted line is a triple bond, both ns represent 1, and

R^1 and R^2 are the same or different, and each represents a fluorine atom or a perfluoroalkyl group,

the method comprising the step of reacting a halogenated hydrocarbon compound represented by formula (2),



wherein

a bond indicated by a solid line and a dotted line is a single bond or a double bond,

if the bond indicated by the solid line and the dotted line is a single bond, both ns represent 2, and if the bond indicated by the solid line and the dotted line is a double bond, both ns represent 1,

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

X^1 and X^2 are the same or different, and each represents a halogen atom,

in an organic solvent in the presence of metal iodides and zinc or a zinc alloy, to obtain a perfluorocarbon compound represented by formula (1).

[Claim 2]

The production method according to claim 1, wherein the amount of the metal iodides is 0.0005 mol or more per mol of the zinc or zinc alloy.

[Claim 3]

A method for producing a perfluoroalkyne compound represented by formula (1A):

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

wherein

R^1 and R^2 are the same or different, and each represents a fluorine atom or a perfluoroalkyl group,

the method comprising the step of reacting a halogenated alkene compound represented by formula (2A):

$X^1R^1C{=}CR^2X^2$ (2A)

wherein

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

X^1 and X^2 are the same or different, and each represents a halogen atom,

in at least one nitrogen-containing polar organic solvent selected from the group consisting ofN-methyl-2-pyrrolidone, 1,3-dimethyl-3,4,5,6-tetrahydropyrimidinone, triamide hexamethylphosphate, triethylamine, 1-methylpyrrolidine, pyridine compounds, and quinoline compounds in the presence of zinc or zinc alloy, to obtain a perfluoroalkyne compound represented by formula (1A).

[Claim 4]

The production method according to any one of claims 1 to 3, wherein the reaction temperature is 0 to 250°C.

[Claim 5]

A composition comprising:

a perfluoroalkyne compound represented by formula (1A):

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

wherein

R^1 and R^2 are the same or different, and each represents a fluorine atom or a perfluoroalkyl group, and

a compound represented by formula (3):

$R^1CH=CHR^2$ (3)

wherein

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

wherein the amount of the perfluoroalkyne compound represented by formula (1A) is 85 to 99.9 mol% and the amount of the compound represented by formula (3) is 3.82 mol% or less, based on the total amount of the composition defined as 100 mol%.

[Claim 6]

The composition according to claim 5, further comprising a compound represented by formula (4):

$R^3C\equiv CR^4$ (4)

wherein

R^3 and R^4 each represents a fluoroalkyl group having one hydrogen atom.

[Claim 7]

The composition according to claim 5 or 6, further comprising a compound represented by formula (5):

$X^1R^1C=CHR^2$ (5)

Wherein

R^1 and R^2 are as defined above, and X^1 represents a halogen atom.

[Claim 8]

The composition according to any one of claims 5 to 7, which is used as a cleaning gas, an etching gas, or a building block for organic synthesis.