Among these groups, a trifluoromethyl group, pentafluoroethyl group or perfluoro-n-propyl group is preferable, and a trifluoromethyl group or pentafluoroethyl group is more preferable.

[0024]

Specific examples of the compound [I] include N-(chlorosulfonyl)-N-(fluorosulfonyl)imide, di(chlorosulfonyl)imide, N-(chlorosulfonyl)-N-(trifluoromethylsulfonyl)imide, N-(chlorosulfonyl)-N-(pentafluoroethylsulfonyl)imide, and N-(chlorosulfonyl)-N-(perfluoro-n-propylsulfonyl)imide.

[0025]

The compound [I] may be a commercially available material, or may be synthesized, for example, using the method disclosed in Z. Anorg. Allg. Chem., 2005, 631, 55 to 59. For example, di(chlorosulfonyl)imide, which is one compound represented by formula [I], can be obtained by reacting chlorosulfonyl isocyanate and chlorosulfonic acid (see Chemisch Berichte 1964, ~~9597~~, 849 to 850).

Further, N-(chlorosulfonyl)-N-(fluoroalkylsulfonyl)imides can be obtained by a reaction between chlorosulfonyl isocyanate and a fluoroalkylsulfonic acid, or by a reaction between a fluoroalkylsulfonyl isocyanate and chlorosulfonic acid.

[0026]

The fluorinating agent [III] used in the present invention is a compound represented by formula [III].

[0027]

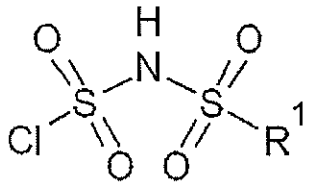
[Chemical Formula 6]

$$NH_4F\ (HF)_p \qquad [III]$$

[0028]

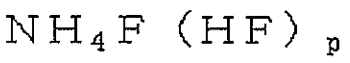
CLAIMS

1. A process for producing a fluorosulfonylimide ammonium salt represented by formula [II], the method comprising reacting a compound represented by formula [I] and a fluorinating agent represented by formula [III]:



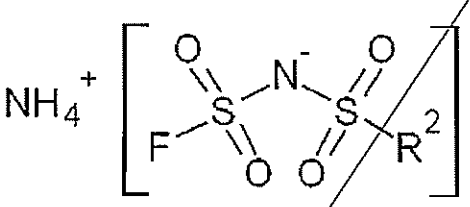
[I]

wherein R^1 represents a fluoroalkyl group having 1 to 6 carbon atoms, a fluorine atom, or a chlorine atom,



[III]

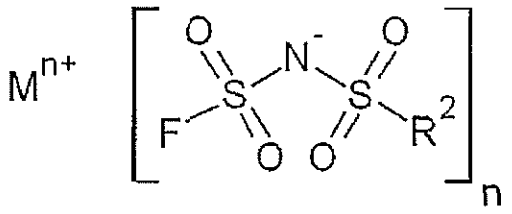
wherein p represents a real number of 0 to 10,



[II]

wherein R^2 represents a fluoroalkyl group having 1 to 6 carbon atoms, or a fluorine atom.

2. A process for producing a fluorosulfonylimide salt represented by formula [IV], the method comprising reacting the fluorosulfonylimide ammonium salt represented by formula [II] obtained by the method according to claim (1) with at least one compound selected from the group consisting of metal compounds, onium compounds and organic amine compounds:



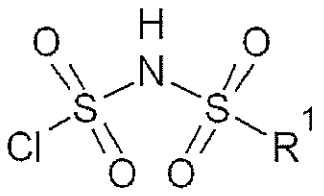
〔IV〕

wherein M^{n+} represents a metal cation or an onium cation (excluding NH_4^+), n corresponds with a valency of the metal cation or the onium cation (excluding NH_4^+) and is an integer of 1 to 4, and R^2 is as defined above in formula [II].

3. The process for producing a fluorosulfonylimide salt according to claim 2, wherein the at least one compound is selected from the group consisting of alkali metal compounds, onium compounds and organic amine compounds.

CLAIMS

1. A process for producing a fluorosulfonylimide ammonium salt represented by formula [II], the method comprising reacting a compound represented by formula [I] and a fluorinating agent represented by formula [III]:

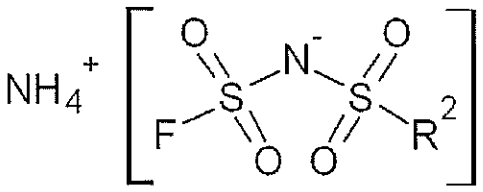


〔I〕

wherein R^1 represents a fluoroalkyl group having 1 to 6 carbon atoms, a fluorine atom, or a chlorine atom,

$$NH_4F(HF)_p \qquad 〔III〕$$

wherein p represents a real number of 0 to 10,

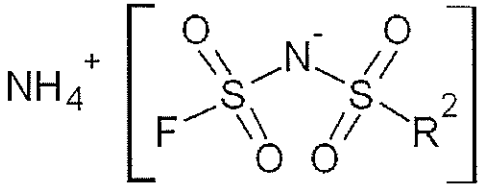


〔II〕

wherein R^2 represents a fluoroalkyl group having 1 to 6 carbon atoms, or a fluorine atom.

2. A process for producing a fluorosulfonylimide salt represented by formula [IV], the method comprising

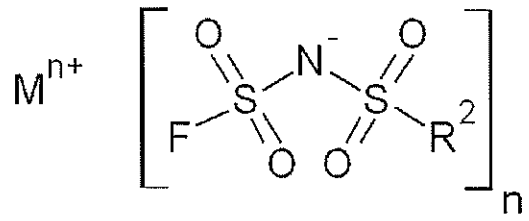
obtaining a fluorosulfonylimide ammonium salt of formula [II] by the process defined in claim 1:



〔II〕

wherein R^2 represents a fluoroalkyl group having 1 to 6 carbon atoms, or a fluorine atom; and

reacting the fluorosulfonylimide ammonium salt represented by formula [II] obtained by the method according to claim (1) with at least one compound selected from the group consisting of metal compounds, onium compounds and organic amine compounds:



[IV]

wherein M^{n+} represents a metal cation or an onium cation (excluding NH_4^+), n corresponds with a valency of the metal cation or the onium cation (excluding NH_4^+) and is an integer of 1 to 4, and R^2 is as defined above in formula [II].

3. The process for producing a fluorosulfonylimide salt according to claim 2, wherein the at least one compound is selected from the group consisting of alkali metal compounds, onium compounds and organic amine compounds.

4. The process for producing a fluorosulfonylimide salt according to claim 3, wherein the reaction of the fluorosulfonylimide ammonium salt of formula [II] with at least one compound is performed under reduced pressure, and

the at least one compound is an alkali metal hydroxide.