HFO- 1234ze and HFO-1234yf. U.S. Patent No. 9,302,962 discloses methods for making HFO- 1234ze. The disclosures of U.S. Patent No. 7,862,742 and U.S. Patent No. 9,302,962 are hereby incorporated by reference in their entirety.

Catalytic dehydrofluorination of HFC-245fa in general produces a mixture of both the E- isomer as well as the Z-isomer of HFC-1234ze. Depending on the particular catalyst chosen, the amount of the Z-isomer can vary between 15% to 23%. Dehydrofluorination in the liquid phase using aqueous solutions of caustic or other strong bases also produces mixture of both isomers. Although the ratio of the two isomers can be shifted somewhat by temperature, about 13% to about 15% of the Z-isomer is typically formed. As the E-isomer is the most useful for refrigeration applications, after separation of the E-isomer from the Z-isomer, the Z-isomer is typically either isomerized to the E-isomer in a separate step or converted back to 245fa through addition of hydrogen fluoride. Both alternatives require additional steps which add cost.

There is a need in this art for a process that can produce compositions of HFO-1234ze and HFO-1234yf that minimizes or eliminates the need for purification or separation steps for removing excess quantities of HFO-1234yf. In particular, there is a need in this art for an economical process that produces compositions comprising HFO-1234ze, HFO-1225zc and HFO-1234yf wherein the amount of HFO-1225zc and HFO-1234yf are each greater than zero and less than about 1 mole percent and wherein the total amount of HFO-1225zc and HFO-1234yf is less than about 1 mole percent.

BRIEF DESCRIPTION OF THE INVENTION

Described is a fluoropropene composition comprising Z-1,3,3,3-tetrafluoropropene, E- 1,3,3,3-tetrafluoropropene, 1,1,3,3,3-pentafluoropropene, 2,3,3,3-tetrafluoropropene, and optionally 1,1,1,3,3- pentafluoropropane. The 2,3,3,3-tetrafluoropropene being present in an amount of 0.00001 to 1.0 mol%, the being present in an amount greater than 0 to 1.0 mole%, and the total amount of 1,1,3,3,3,-pentafluoropropene and 2,3,3,3-tetrafluoropropene is greater than 0 and less than 1.0 mol%

In addition, the present disclosure includes a method of producing a mixture of a fluoropropene of formula $CF_3CH=CHF$ and a fluoropropene of formula

One embodiment of the invention relates to a process for treating a surface, comprising:

providing a surface;

contacting the surface with a treatment composition;

wherein the surface includes a treatable material deposited thereon; and wherein the treatment composition comprises the fluoropropene composition of any combination of the foregoing embodiments.

One embodiment of the invention relates to any combination of the foregoing wherein the treatment composition substantially dissolves the treatable material.

One embodiment of the invention relates to a process for forming a composition comprising:

providing a solute; contacting the solute with a solvent;

wherein the solvent comprises the fluoropropene composition of any of the foregoing embodiments.

Another embodiment of the invention relates to a refrigeration system, comprising:

an evaporator; a condenser;

a compressor; an expansion device;

and a heat transfer media;

wherein the heat transfer media comprises the fluoropropene composition of any combination of the foregoing embodiments and including a near azeotropic composition produced by the inventive method.

The foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the invention, as defined in the appended claims. The various embodiments of the invention can be used alone or in combinations with each other. Other features and advantages of the present invention will be apparent from the following more detailed description of the preferred embodiment, which illustrate, by way of example, the principles of the invention.