refrigerants. US Patent No 7,862,742 discloses compositions comprising 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 near azeotropic 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 near azeotropic compositions comprising HFO-1234ze and greater than zero and less than about 1 weight percent HFO-1234yf.

BRIEF DESCRIPTION OF THE INVENTION

Described is a fluoropropene composition comprising Z-1,3,3,3-tetrafluoropropene, E- 1,3,3,3-tetrafluoropropene, 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 0.001 to 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 $CF_3CF=CH_2$, comprising contacting a mixture of 1,1,1,3,3-pentafluoropropane and Z-,1,3,3,3-tetrafluoropropene in the gas phase with a catalyst comprising at least one catalyst selected from the group consisting of fluorinated Cr2O3 or Cr/Ni on fluorinated alumina, in the

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.

DETAILED DESCRIPTION OF THE INVENTION

Described is a method of producing a mixture of a fluoropropene of formula $CF_3CH=CHF$ and a fluoropropene of formula $CF_3CF=CH_2$, comprising contacting a mixture of 1,1,1,3,3- pentafluoropropane and Z-,1,3,3,3-tetrafluoropropene in the gas phase with a catalyst comprising at least one catalyst selected from the group consisting of fluorinated Cr_2O_3 or Cr/Ni on fluoride alumina, optionally in the presence of an oxygen containing gas, to form a mixture comprising Z- 1,3,3,3-tetrafluoropropene, E-1,3,3,3,-tetrafluoropropene, 2,3,3,3-tetrafluoropropene, and, optionally, unreacted 1,1,1,3,3-pentafluoropropane.

Certain dehydrofluorination reactions are well known in the art. The dehydrofluorination of HFC-245fa has been particularly studied. Both gas phase and liquid phases processes are known. 1,3,3,3-tetrafluoropropene (HFO-1234ze) exists as both a Z-isomer and an E-isomer about the double bond. Both gas phase and liquid phase processes are known to produce a mixture of both the Z- and E-isomers, with the E-isomer predominating. The selectivity for the production of the Z-isomer can vary from about