their widespread use may also be limited in the future. Thus, there is a need for compositions that do not contribute to the destruction of stratospheric ozone and also have low global warming potentials (GWPs). Certain hydrofluoroolefins, such as 1,1,1,4,4,4-hexafluoro-2-butene ($CF_3CH=CHCF_3$, FC-1336mzz), are believed to meet both goals.

SUMMARY OF THE INVENTION

This application includes eight different types of azeotropic or azeotrope-like mixtures.

This disclosure provides a composition consisting essentially of (a) Z-FC-1336mzz and (b) methyl formate; wherein the methyl formate is present in an effective amount to form an azeotropic or azeotrope-like mixture with Z-FC-1336mzz.

This disclosure also provides a composition consisting essentially of (a) Z-FC-1336mzz and (b) pentane; wherein the pentane is present in an effective amount to form an azeotropic or azeotrope-like mixture with Z-FC-1336mzz.

This disclosure also provides a composition consisting essentially of (a) Z-FC-1336mzz and (b) 2-methylbutane (isopentane); wherein the isopentane is present in an effective amount to form an azeotropic or azeotrope-like mixture with Z-FC-1336mzz.

In one aspect, there is~~This disclosure also~~ provided a composition consisting essentially of (a) Z-FC-1336mzz and (b) 1,1,1,3,3-pentafluorobutane ($CF_3CH_2CF_2CH_3$, HFC-365mfc); wherein the HFC-365mfc is present in an effective amount to form an azeotrope-like mixture with Z-FC-1336mzz.

This disclosure also provides a composition consisting essentially of (a) Z-FC-1336mzz and (b) trans-1,2-dichloroethylene; wherein the trans-1,2-dichloroethylene is present in an effective amount to form an azeotropic or azeotrope-like mixture with Z-FC-1336mzz.

This disclosure also provides a composition consisting essentially of (a) Z-FC-1336mzz and (b) 1,1,1,3,3-pentafluoropropane ($CF_3CH_2CF_2H$,

HFC-245fa); wherein the HFC-245fa is present in an effective amount to form an azeotrope-like mixture with Z-FC-1336mzz.

This disclosure also provides a composition consisting essentially of (a) Z-FC-1336mzz and (b) dimethoxymethane ($CH_3OCH_2OCH_3$, methylal); wherein the dimethoxymethane is present in an effective amount to form an azeotrope-like mixture with Z-FC-1336mzz.

This disclosure also provides a composition consisting essentially of (a) Z-FC-1336mzz and (b) cyclopentane (c-C_5H_{10}); wherein the cyclopentane is present in an effective amount to form an azeotropic or azeotrope-like mixture with Z-FC-1336mzz.

In another aspect, there is provided a process for preparing a thermoplastic or thermoset foam comprising using an azeotrope-like composition as a blowing agent, wherein said azeotrope-like composition consists essentially of Z-1,1,1,4,4,4-hexafluoro-2-butene and 1,1,1,3,3-pentafluorobutane.

In another aspect, there is provided a process for producing refrigeration comprising condensing an azeotrope-like composition and thereafter evaporating said azeotrope-like composition in the vicinity of the body to be cooled, wherein said azeotrope-like composition consists essentially of Z-1,1,1,4,4,4-hexafluoro-2-butene and 1,1,1,3,3-pentafluorobutane.

In another aspect, there is provided a process comprising using an azeotrope-like composition as a solvent, wherein said azeotrope-like composition consists essentially of Z-1,1,1,4,4,4-hexafluoro-2-butene and 1,1,1,3,3-pentafluorobutane.

In another aspect, there is provided a process for producing an aerosol product comprising using an azeotrope-like composition as a propellant, wherein said azeotrope-like composition consists essentially of Z-1,1,1,4,4,4-hexafluoro-2-butene and 1,1,1,3,3-pentafluorobutane.

In another aspect, there is provided a process comprising using an azeotrope-like composition as a heat transfer media, wherein said azeotrope-like composition consists essentially of Z-1,1,1,4,4,4-hexafluoro-2-butene and 1,1,1,3,3-pentafluorobutane.

In another aspect, there is provided a process for extinguishing or suppressing a fire comprising using an azeotrope-like composition as a fire extinguishing or suppression agent, wherein said azeotrope-like composition consists essentially of Z-1,1,1,4,4,4-hexafluoro-2-butene and 1,1,1,3,3-pentafluorobutane.

In another aspect, there is provided a process comprising using an azeotrope-like composition as dielectrics, wherein said azeotrope-like composition consists essentially of Z-1,1,1,4,4,4-hexafluoro-2-butene and 1,1,1,3,3-pentafluorobutane.

BRIEF SUMMARY OF THE DRAWINGS

FIG. 1 - FIG. 1 is a graphical representation of an azeotrope and azeotrope-like compositions consisting essentially of Z-FC-1336mzz and methyl formate at a temperature of about 50.1 °C.

FIG. 2 - FIG. 2 is a graphical representation of an azeotrope and azeotrope-like compositions consisting essentially of Z-FC-1336mzz and pentane at a temperature of about 19.9 °C.

FIG. 3 - FIG. 3 is a graphical representation of an azeotrope and azeotrope-like compositions consisting essentially of Z-FC-1336mzz and isopentane at a temperature of about 19.9 °C.

FIG. 4 - FIG. 4 is a graphical representation of azeotrope-like compositions consisting essentially of Z-FC-1336mzz and HFC-365mfc at a temperature of about 50.0 °C.

FIG. 5 - FIG. 5 is a graphical representation of an azeotrope and azeotrope-like compositions consisting essentially of Z-FC-1336mzz and trans-1,2-dichloroethylene at a temperature of about 50.1 °C.