and also to serve as refrigerants in new equipment designed for similar applications.

In searching for a replacement for 1,1,1,2-tetrafluoroethane (HFC-134a) and difluorotrichloromethane (CFC-12) in particular in chiller applications, it would be desirable to consider compositions comprising unsaturated fluorocarbons. The unsaturated fluorocarbons have zero ODP and significantly lower GWP than the refrigerants in use today.

SUMMARY ~~OF THE INVENTION~~

It has been found that compositions comprising from about 6 to about 82 weight percent 2,3,3,3-tetrafluoropropene (e.g., from about 38 to about 82 weight percent 2,3,3,3-tetrafluoropropene) and from about 94 to about 18 weight percent 1,1,1,2-tetrafluoroethane (e.g., from about 62 to about 18 weight percent 1,1,1,2-tetrafluoroethane) when used as working fluids in chillers enable high energy efficiency and cooling capacity while having low GWP and low ODP values. Of particular note are embodiments of these compositions that are azeotropic and azeotrope-like compositions; and embodiments of these compositions that are non-flammable.

In one aspect of the invention, there is provided a chiller apparatus containing a composition comprising from about 38 to about 67 weight percent 2,3,3,3-tetrafluoropropene and from about 62 to about 33 weight percent 1,1,1,2-tetrafluoroethane, wherein the chiller apparatus is a centrifugal chiller.

In another aspect of the invention, there is provided a method for producing cooling in a chiller comprising (a) evaporating a liquid refrigerant comprising from about 38 to 67 weight percent 2,3,3,3-tetrafluoropropene and from about 62 to 33 weight percent 1,1,1,2-tetrafluoroethane in an evaporator having a heat transfer medium passing therethrough thereby producing a vapor refrigerant; and (b) compressing the vapor refrigerant in a compressor, wherein the volumetric cooling capacity of the refrigerant is greater than the individual volumetric cooling capacities of 2,3,3,3-tetrafluoropropene alone and 1,1,1,2-tetrafluoroethane alone, wherein the chiller apparatus is a centrifugal chiller.

In another aspect of the invention, there is provided a method for replacing a refrigerant in a chiller designed for using HFC-134a or CFC-12 as refrigerant, comprising charging said chiller with a composition comprising a refrigerant consisting essentially of from about 38 to 67 weight percent 2,3,3,3-tetrafluoropropene and from about 62 to 33 weight percent 1,1,1,2-tetrafluoroethane thereby increasing the cooling capacity of the chiller, wherein the chiller apparatus is a centrifugal chiller.

In another aspect of the invention, there is provided a chiller apparatus containing a composition comprising from about 20 to about 60 weight percent 2,3,3,3-tetrafluoropropene and from about 80 to about 40 weight percent 1,1,1,2-tetrafluoroethane, wherein the chiller apparatus is a centrifugal chiller.

This ~~invention~~disclosure further provides a chiller apparatus containing a composition comprising from about 6 to about 70 weight percent 2,3,3,3-tetrafluoropropene and from about 30 to about 94 weight percent 1,1,1,2-tetrafluoroethane.

This ~~invention~~disclosure further provides compositions comprising from about 51 to about 67 weight percent 2,3,3,3-tetrafluoropropene and from about 49 to about 33 weight percent 1,1,1,2-tetrafluoroethane.

This ~~invention~~disclosure further provides compositions comprising from about 58.0 to about 59.5 weight percent 2,3,3,3-tetrafluoropropene and from about 42.0 to about 40.5 weight percent 1,1,1,2-tetrafluoroethane.

This ~~invention~~disclosure further provides compositions comprising from about 54.0 to about 56.0 weight percent 2,3,3,3-tetrafluoropropene and from about 46.0 to about 44.0 weight percent 1,1,1,2-tetrafluoroethane.

This ~~invention~~disclosure further provides compositions comprising a refrigerant consisting essentially of from about 51 to about 67 weight percent 2,3,3,3-tetrafluoropropene and from about 49 to about 33 weight percent 1,1,1,2-tetrafluoroethane.

This ~~invention~~disclosure further provides compositions comprising a refrigerant consisting essentially of from about 58.0 to about 59.5 weight percent 2,3,3,3-tetrafluoropropene and from about 42.0 to about 40.5 weight percent 1,1,1,2-tetrafluoroethane.

This ~~invention~~disclosure further provides composition comprising a refrigerant consisting essentially of from about 54.0 to about 56.0 weight percent 2,3,3,3-tetrafluoropropene and from about 46.0 to about 44.0 weight percent 1,1,1,2-tetrafluoroethane.

This ~~invention~~disclosure further provides a method for producing cooling in a chiller comprising (a) evaporating a liquid refrigerant comprising from about 6 to about 70 weight percent 2,3,3,3-tetrafluoropropene and from about 30 to about 94 weight percent 1,1,1,2-tetrafluoroethane in an evaporator having a heat transfer medium passing therethrough thereby producing a vapor refrigerant; and (b) compressing the vapor refrigerant in a centrifugal compressor, wherein the volumetric cooling capacity of the refrigerant is greater than the individual volumetric cooling capacities of 2,3,3,3-tetrafluoropropene alone and 1,1,1,2-tetrafluoroethane alone.

This ~~invention~~disclosure further provides a method for replacing a refrigerant in a chiller designed for using HFC-134a or CFC-12 as refrigerant, comprising charging said chiller with a composition comprising a refrigerant consisting essentially of from about 6 to about 70 weight percent 2,3,3,3-tetrafluoropropene and from about 30 to about 94 weight percent 1,1,1,2-tetrafluoroethane thereby increasing the cooling capacity of the chiller.