CLAIMS

What is claimed is:

1. A process for transferring heat, comprising:

providing an article;

contacting the article with a heat transfer media;

wherein the heat transfer media comprises a composition comprising 1,1,1,2,2,5,5,6,6,7,7,7-dodecafluorohept-2-ene, $C_3F_7CH=CHC_2F_5$ (F23E) and 1,1,1,4,4,5,5,5-octafluoropent-2-ene, $CF_3CH=CHC_2F_5$ (F12E); or

1,1,1,2,2,5,5,6,6,7,7,7-dodecafluorohept-2-ene, $C_3F_7CH=CHC_2F_5$ (F23E) and

a co-compound including at least one of (E)-1,1,1,4,4,4-hexafluoro-2-butene, (HFO-1336mzz(E), $CF_3CH=CHCF_3$), or (Z)-1,1,1,4,4,4-hexafluoro-2-butene, (HFO-1336mzz(Z), $CF_3CH=CHCF_3$).

2. A process for transferring heat, comprising:

providing an article;

contacting the article with a heat transfer media;

wherein the heat transfer media comprises a composition formed by the process of,

contacting $CF_3CH=CHF$ (1234ze);

with a fluorinated ethylene compound

wherein the fluorinated ethylene compound is tetrafluoro-ethene, $CF_2=CF_2$ (TFE);

in the presence of a Lewis acid catalyst in an amount sufficient to form a composition comprising a compound of formula (3),

$$CF_3(CX_5X_6CX_7X_8)_nCH=CHCX_9X_{10}CX_{11}X_{12}F \quad (3)$$

wherein the compound of formula (3) includes 1,1,1,2,2,5,5,6,6,7,7,7-dodecafluorohept-2-ene, $C_3F_7CH=CHC_2F_5$ (F23E); and

wherein the heat transfer media further comprises 1,1,1,4,4,5,5,5-

octafluoropent-2-ene, $CF_3CH=CHC_2F_5$ (F12E), or

a co-compound including at least one of (E)-1,1,1,4,4,4-hexafluoro-2-butene, (HFO-1336mzz(E), $CF_3CH=CHCF_3$), or (Z)-1,1,1,4,4,4-hexafluoro-2-butene, (HFO-1336mzz(Z), $CF_3CH=CHCF_3$).

3. 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 a composition comprising 1,1,1,2,2,5,5,6,6,7,7,7-dodecafluorohept-2-ene, $C_3F_7CH=CHC_2F_5$ (F23E) and 1,1,1,4,4,5,5,5-octafluoropent-2-ene, $CF_3CH=CHC_2F_5$ (F12E), or

wherein the treatment composition comprises a composition comprising 1,1,1,2,2,5,5,6,6,7,7,7-dodecafluorohept-2-ene, $C_3F_7CH=CHC_2F_5$ (F23E); and

at least one of (E)-1,1,1,4,4,4-hexafluoro-2-butene, (HFO-1336mzz(E), $CF_3CH=CHCF_3$) or (Z)-1,1,1,4,4,4-hexafluoro-2-butene, (HFO-1336mzz(Z), $CF_3CH=CHCF_3$).

4. A cooling, heating or power generation system, comprising:

an evaporator;

a condenser;

a compressor;

an expansion device; and

a heat transfer media;

wherein the heat transfer media comprises a composition comprising $C_3F_7CH=CHC_2F_5$ (F23E) and 1,1,1,4,4,5,5,5-octafluoropent-2-ene, $CF_3CH=CHC_2F_5$ (F12E), or

wherein the heat transfer media comprises a composition comprising 1,1,1,2,2,5,5,6,6,7,7,7-dodecafluorohept-2-ene, $C_3F_7CH=CHC_2F_5$ (F23E); and

at least one of (E)-1,1,1,4,4,4-hexafluoro-2-butene, (HFO-1336mzz(E), $CF_3CH=CHCF_3$) or (Z)-1,1,1,4,4,4-hexafluoro-2-butene, (HFO-1336mzz(Z), $CF_3CH=CHCF_3$).

5. The system of claim 4, where the condenser is operated at a temperature higher than 100°C.

6. A heat pipe system comprising:

a heat pipe having a working fluid therein;

wherein the working fluid comprises a composition comprising $C_3F_7CH=CHC_2F_5$ (F23E) and 1,1,1,4,4,5,5,5-octafluoropent-2-ene, $CF_3CH=CHC_2F_5$ (F12E), or;

wherein the working fluid comprises a composition comprising $C_3F_7CH=CHC_2F_5$ (F23E) and at least one of (E)-1,1,1,4,4,4-hexafluoro-2-butene, (HFO-1336mzz(E), $CF_3CH=CHCF_3$) or (Z)-1,1,1,4,4,4-hexafluoro-2-butene, (HFO-1336mzz(Z), $CF_3CH=CHCF_3$).

7. A process for recovering heat from a heat source and generating mechanical energy, comprising the steps of:

(a) passing a first working fluid in liquid phase through a heat exchanger or an evaporator, wherein said heat exchanger or said evaporator is in communication with said heat source that supplies said heat;

(b) removing at least a portion of said first working fluid in a vapor phase from said heat exchanger or said evaporator;

(c) passing said at least a portion of said first working fluid in vapor phase to an expander, wherein at least portion of said heat is converted into mechanical energy;

(d) passing said at least a portion of said first working fluid in vapor phase from said expander to a condenser, wherein said at least a portion of said first working fluid in vapor phase is condensed to a second working fluid in liquid phase;

(e) optionally, compressing and mixing said second working fluid in liquid phase with said first working fluid in liquid phase in Step

(a); and

(f) optionally, repeating Steps (a) through (e), at least one time;

wherein at least one of the first working fluid or the second working fluid comprises a composition comprising 1,1,1,2,2,5,5,6,6,7,7,7-dodecafluorohept-2-ene, $C_3F_7CH=CHC_2F_5$ (F23E); and 1,1,1,4,4,5,5,5-octafluoropent-2-ene, $CF_3CH=CHC_2F_5$ (F12E), or

wherein at least one of the first working fluid or the second working fluid comprises a composition comprising 1,1,1,2,2,5,5,6,6,7,7,7-dodecafluorohept-2-ene, $C_3F_7CH=CHC_2F_5$ (F23E); and at least one of (E)-1,1,1,4,4,4-hexafluoro-2-butene, (HFO-1336mzz(E), $CF_3CH=CHCF_3$) or (Z)-1,1,1,4,4,4-hexafluoro-2-butene, (HFO-1336mzz(Z), $CF_3CH=CHCF_3$).

8. A high temperature heat pump apparatus, said apparatus comprising (a) a first heat exchanger through which a working fluid flows and is heated; (b) a compressor in fluid communication with the first heat exchanger that compresses the heated working fluid to a higher pressure; (c) a second heat exchanger in fluid communication with the compressor through which the high pressure working fluid flows and is cooled; and (d) a pressure reduction device in fluid communication with the second heat exchanger wherein the pressure of the cooled working fluid is reduced and said pressure reduction device further being in fluid communication with the evaporator such that the working fluid then repeats flow through components (a), (b), (c) and (d) in a repeating cycle, wherein at least one of the first working fluid or the second working fluid comprises a composition comprising

1,1,1,2,2,5,5,6,6,7,7,7-dodecafluorohept-2-ene, $C_3F_7CH=CHC_2F_5$ (F23E); and 1,1,1,4,4,5,5,5-octafluoropent-2-ene, $CF_3CH=CHC_2F_5$ (F12E), or

wherein at least one of the first working fluid or the second working fluid comprises a composition comprising 1,1,1,2,2,5,5,6,6,7,7,7-dodecafluorohept-2-ene, $C_3F_7CH=CHC_2F_5$ (F23E); and a co-compound including at least one of (E)-1,1,1,4,4,4-

hexafluoro-2-butene, (HFO-1336mzz(E), $CF_3CH=CHCF_3$) or (Z)-1,1,1,4,4,4-hexafluoro-2-butene, (HFO-1336mzz(Z), $CF_3CH=CHCF_3$).