CLAIMS:

The claimed invention is:

1. A composition comprising:

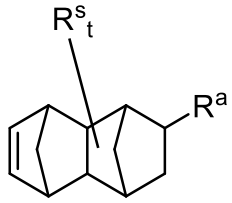
a) at least one cyclic olefin monomer;

b) optionally at least one linear olefin monomer;

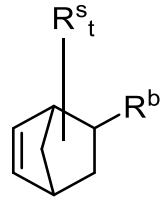
c) at least one thermoplastic hydrocarbon resin; and

d) at least one olefin metathesis catalyst.

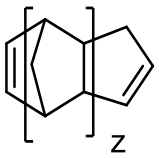
2. The composition of claim 1, wherein the cyclic olefin monomer is selected from the group consisting of **Formulae (I)**, **(II)**, **(III)**, **(V)**, **(VI)**, and mixtures thereof:



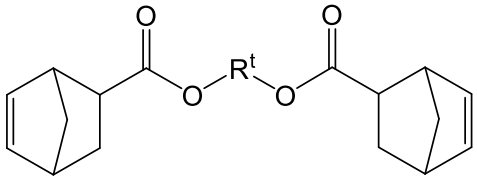
Formula (I),



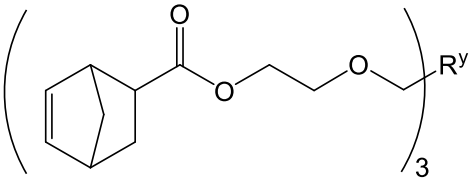
Formula (II),



Formula (III),

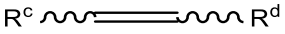


Formula (V), and



Formula (VI), and

the linear olefin monomer, if present, has the structure of **Formula (IV)**:



Formula (IV) wherein:

R^a is H, optionally substituted linear or branched C_{1-24} alkyl, optionally substituted linear or branched C_{2-24} alkenyl, halogen, $-C(O)R^f$, $-CH_2-C(O)R^f$, $-OR^g$, $-CH_2-OR^g$, -CN, $-NO_2$, $-CF_3$, $-P(O)(OR^h)_2$, $-OP(O)(OR^h)_2$, $-S(O)_2OR^h$, $-OS(O)_2R^h$, optionally substituted heterocycle, $-CH_2-$(optionally substituted heterocycle), optionally substituted C_{3-10} cycloalkyl, $-CH_2-$(optionally

substituted C_{3-10} cycloalkyl), optionally substituted C_{5-24} aryl, -CH_2-(optionally substituted C_{5-24} aryl), optionally substituted C_{3-12} cycloalkenyl, -CH_2-(optionally substituted C_{3-12} cycloalkenyl), $C(R^h)(R^i)COOR^j$, $-C(R^h)(R^i)C(O)H$, $-C(R^h)(R^i)C(O)R^k$, $-C(R^h)(R^i)CR^l(OR^m)(OR^n)$, $-C(R^h)(R^i)C(O)NR^oR^p$, $-C(R^h)(R^i)C(O)NR^oOR^n$, or ;

R^b is H, optionally substituted linear or branched C_{1-24} alkyl, optionally substituted linear or branched C_{2-24} alkenyl, halogen, $-C(O)R^f$, -CH_2-$C(O)R^f$, $-OR^g$, -CH_2-OR^g, -CN, -NO_2, -CF_3, $-P(O)(OR^h)_2$, $-OP(O)(OR^h)_2$, $-Si(OR^k)_3$ $-S(O)_2OR^h$, $-OS(O)_2R^h$, optionally substituted heterocycle, spiro optionally substituted heterocycle, -CH_2-(optionally substituted heterocycle), optionally substituted C_{3-10} cycloalkyl, -CH_2-(optionally substituted C_{3-10} cycloalkyl), optionally substituted C_{5-24} aryl, -CH_2-(optionally substituted C_{5-24} aryl), optionally substituted C_{3-12} cycloalkenyl, -CH_2-(optionally substituted C_{3-12} cycloalkenyl), $C(R^h)(R^i)COOR^j$, $-C(R^h)(R^i)C(O)H$, $-C(R^h)(R^i)C(O)R^k$, $-C(R^h)(R^i)CR^l(OR^m)(OR^n)$, $-C(R^h)(R^i)C(O)NR^oR^p$, $-C(R^h)(R^i)C(O)NR^oOR^n$;

R^c is H, optionally substituted linear or branched C_{1-24} alkyl, optionally substituted linear or branched C_{2-24} alkenyl, halogen, $-C(O)R^f$, -CH_2-$C(O)R^f$, $-OR^g$, -CH_2-OR^g, CN, NO_2, -CF_3, $-P(O)(OR^h)_2$, $-OP(O)(OR^h)_2$, $-S(O)_2OR^h$, $-OS(O)_2R^h$, optionally substituted heterocycle, -CH_2-(optionally substituted heterocycle), optionally substituted C_{3-10} cycloalkyl, -CH_2-(optionally substituted C_{3-10} cycloalkyl), optionally substituted C_{5-24} aryl, -CH_2-(optionally substituted C_{5-24} aryl), optionally substituted C_{3-12} cycloalkenyl, -CH_2-(optionally substituted C_{3-12} cycloalkenyl), $C(R^h)(R^i)COOR^j$, $-C(R^h)(R^i)C(O)H$, $-C(R^h)(R^i)C(O)R^k$, $-C(R^h)(R^i)CR^l(OR^m)(OR^n)$, $-C(R^h)(R^i)C(O)NR^oR^p$, $-C(R^h)(R^i)C(O)NR^oOR^n$;

R^d is H, optionally substituted linear or branched C_{1-24} alkyl, optionally substituted linear or branched C_{2-24} alkenyl, halogen, $-C(O)R^f$, -CH_2-$C(O)R^f$, $-OR^g$, -CH_2-OR^g, CN, NO_2, -CF_3-$P(O)(OR^h)_2$, $-OP(O)(OR^h)_2$, $-S(O)_2OR^h$, $-OS(O)_2R^h$, optionally substituted heterocycle, -CH_2-(optionally substituted heterocycle), optionally substituted C_{3-10} cycloalkyl, -CH_2-(optionally substituted C_{3-10} cycloalkyl), optionally substituted C_{5-24} aryl, -CH_2-(optionally substituted C_{5-24} aryl), optionally substituted C_{3-12} cycloalkenyl, -CH_2-(optionally substituted C_{3-12} cycloalkenyl), $C(R^h)(R^i)COOR^j$, $-C(R^h)(R^i)C(O)H$, $-C(R^h)(R^i)C(O)R^k$, $-C(R^h)(R^i)CR^l(OR^m)(OR^n)$, $-C(R^h)(R^i)C(O)NR^oR^p$, $-C(R^h)(R^i)C(O)NR^oOR^n$;

each R^s is independently optionally substituted linear or branched C_{1-24} alkyl, optionally substituted linear or branched C_{2-24} alkenyl, halogen, $-C(O)R^f$, $-CH_2-C(O)R^f$, $-OR^g$, $-CH_2-OR^g$, -CN, $-NO_2$, $-CF_3$, $-P(O)(OR^h)_2$, $-OP(O)(OR^h)_2$, $-S(O)_2OR^h$, $-OS(O)_2R^h$, optionally substituted heterocycle, $-CH_2-$(optionally substituted heterocycle), optionally substituted C_{3-10} cycloalkyl, $-CH_2-$(optionally substituted C_{3-10} cycloalkyl), optionally substituted C_{5-24} aryl, $-CH_2-$(optionally substituted C_{5-24} aryl), optionally substituted C_{3-12} cycloalkenyl, $-CH_2-$(optionally substituted C_{3-12} cycloalkenyl), $C(R^h)(R^i)COOR^j$, $-C(R^h)(R^i)C(O)H$, $-C(R^h)(R^i)C(O)R^k$, $-C(R^h)(R^i)CR^l(OR^m)(OR^n)$, $-C(R^h)(R^i)C(O)NR^oR^p$, $-C(R^h)(R^i)C(O)NR^oOR^n$;

t is 0, 1, 2, 3, 4, 5, or 6;

R^f is OH, OR^k, NR^gR^h, optionally substituted linear or branched C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-12} cycloalkenyl;

R^g is H, optionally substituted linear or branched C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, optionally substituted linear or branched C_{2-24} alkenyl, -C(O)-(optionally substituted C_{5-24} aryl), -C(O)-(optionally substituted linear or branched C_{2-24} alkenyl), or optionally substituted C_{3-12} cycloalkenyl;

R^h is H, optionally substituted linear or branched C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-12} cycloalkenyl;

R^i is H, optionally substituted linear or branched C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-12} cycloalkenyl;

R^j is H, optionally substituted linear or branched C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-12} cycloalkenyl;

R^k is optionally substituted linear or branched C_{1-24} alkyl, optionally substituted linear or branched C_{2-24} alkenyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, optionally substituted C_{3-12} cycloalkenyl, $-CH_2-$(optionally

substituted C_{3-10} cycloalkyl), -CH_2-(optionally substituted C_{5-24} aryl), or -CH_2-(optionally substituted C_{3-12} cycloalkenyl);

R^l is H, optionally substituted linear or branched C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-12} cycloalkenyl;

R^m is H, optionally substituted linear or branched C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-12} cycloalkenyl;

R^n is H, optionally substituted linear or branched C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-12} cycloalkenyl;

R^o is H, optionally substituted linear or branched C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-12} cycloalkenyl;

R^p is H, optionally substituted linear or branched C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-12} cycloalkenyl;

R^t is an optionally substituted linear or branched C_1-C_{12} alkyl, -(optionally substituted linear or branched C_1-C_6 alkyl)-R^u-(optionally substituted linear or branched C_1-C_6 alkyl)-, or -(R^v)-(R^w)-(R^x)-;

R^u is O, an optionally substituted C_3-C_{10}-cycloalkyl, optionally substituted C_3-C_{12} cycloalkenyl, optionally substituted heterocycle, or optionally substituted C_5-C_{24} aryl;

R^v and R^x are independently selected from -(optionally substituted linear or branched C_1-C_{12} alkyl)-aryl-, wherein one or more of the carbon atoms in the C_1-C_{12} alkyl may be replaced by O;

R^w is optionally substituted linear or branched C_1-C_6 alkyl;

R^y is optionally substituted linear or branched C_1-C_6 alkyl; and

z is 0, 1, 2, or 3.

3. The composition of claim 2, wherein:

R^a is H, optionally substituted linear or branched C_{1-12} alkyl, optionally substituted linear or branched C_{2-6} alkenyl, halogen, $-C(O)R^f$, $-OR^g$, -CN, $-NO_2$, $-CF_3$, $-P(O)(OR^h)_2$, $-OP(O)(OR^h)_2$, $-S(O)_2OR^h$, $-OS(O)_2R^h$, optionally substituted heterocycle, optionally substituted C_{3-10} cycloalkyl, optionally substituted C_{6-10} aryl, ~~or~~ optionally substituted C_{3-12} cycloalkenyl, or ;

R^b is H, optionally substituted linear or branched C_{1-12} alkyl, optionally substituted linear or branched C_{2-6} alkenyl, halogen, $-C(O)R^f$, $-OR^g$, -CN, $-NO_2$, $-CF_3$, $-P(O)(OR^h)_2$, $-OP(O)(OR^h)_2$, $-S(O)_2OR^h$, $-OS(O)_2R^h$, optionally substituted heterocycle, optionally substituted C_{3-10} cycloalkyl, optionally substituted C_{6-10} aryl, or optionally substituted C_{3-12} cycloalkenyl;

R^c is H, optionally substituted linear or branched C_{1-12} alkyl, optionally substituted linear or branched C_{2-6} alkenyl, halogen, $-C(O)R^f$, $-OR^g$, -CN, $-NO_2$, $-CF_3$, $-P(O)(OR^h)_2$, $-OP(O)(OR^h)_2$, $-S(O)_2OR^h$, $-OS(O)_2R^h$, optionally substituted heterocycle, optionally substituted C_{3-10} cycloalkyl, optionally substituted C_{6-10} aryl, or optionally substituted C_{3-12} cycloalkenyl;

R^d is H, optionally substituted linear or branched C_{1-12} alkyl, optionally substituted linear or branched C_{2-6} alkenyl, halogen, $-C(O)R^f$, $-OR^g$, -CN, $-NO_2$, $-CF_3$, $-P(O)(OR^h)_2$, $-OP(O)(OR^h)_2$, $-S(O)_2OR^h$, $-OS(O)_2R^h$, optionally substituted heterocycle, optionally substituted C_{3-10} cycloalkyl, optionally substituted C_{6-10} aryl, or optionally substituted C_{3-12} cycloalkenyl;

t is 0;

R^f is OH, OR^k, NR^gR^h, optionally substituted C_{1-12} alkyl, optionally substituted C_{3-8} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{6-10} aryl, or optionally substituted C_{3-12} cycloalkenyl;

R^g is H, optionally substituted C_{1-12} alkyl, optionally substituted C_{3-8} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{6-10} aryl, or optionally substituted C_{3-12} cycloalkenyl;

R^h is H, optionally substituted C_{1-12} alkyl, optionally substituted C_{3-8} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{6-10} aryl, or optionally substituted C_{3-12} cycloalkenyl;

z is 2;

R^i is H, optionally substituted C_{1-12} alkyl, optionally substituted C_{3-8} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{6-10} aryl, or optionally substituted C_{3-12} cycloalkenyl;

R^j is H, optionally substituted C_{1-12} alkyl, optionally substituted C_{3-8} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{6-10} aryl, or optionally substituted C_{3-12} cycloalkenyl;

R^k is optionally substituted C_{1-12} alkyl, optionally substituted linear or branched C_{2-12} alkenyl, optionally substituted C_{3-8} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{6-10} aryl, optionally substituted C_{3-12} cycloalkenyl, $-CH_2-$(optionally substituted C_{3-10} cycloalkyl), $-CH_2-$(optionally substituted C_{5-24} aryl), or $-CH_2-$(optionally substituted C_{3-12} cycloalkenyl);

R^l is H, optionally substituted C_{1-12} alkyl, optionally substituted C_{3-8} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{6-10} aryl, or optionally substituted C_{3-12} cycloalkenyl;

R^m is H, optionally substituted C_{1-12} alkyl, optionally substituted C_{3-8} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{6-10} aryl, or optionally substituted C_{3-12} cycloalkenyl;

R^n is H, optionally substituted C_{1-12} alkyl, optionally substituted C_{3-8} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{6-10} aryl, or optionally substituted C_{3-12} cycloalkenyl;

R^o is H, optionally substituted C_{1-12} alkyl, optionally substituted C_{3-8} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{6-10} aryl, or optionally substituted C_{3-12} cycloalkenyl; and

R^p is H, optionally substituted C_{1-12} alkyl, optionally substituted C_{3-8} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{6-10} aryl, or optionally substituted C_{3-12} cycloalkenyl.

4. The composition of claim 2 or claim 3, wherein

the cyclic olefin monomer of **formula (I)** is tetracyclododecene (TCD), 2-ethylidene-1,2,3,4,4a,5,8,8a-octahydro-1,4:5,8-dimethanonaphthalene (ENB-DDA), 2-hexyl-1,2,3,4,4a,5,8,8a-octahydro-1,4:5,8-dimethanonaphthalene (HNB-DDA), or a mixture thereof;

the cyclic olefin monomer of **formula (II)** is 5-ethylidene-2-norbornene (ENB), 5-octyl-2-norbornene (ONB), 2-hydroxyethyl bicyclo[2.2.1]hept-5-ene-2-carboxylate (HENB), 5-carboxylic acid-2-norbornene ethyl ester, carbamic acid, [3-(triethoxysilyl)propyl]-bicyclo[2.2.1]hept-5-en-2-ylmethyl ester (NBCbSi), 5-norbornene-2-methanol (NB-methanol), 5-norbornene-2-exo,3-exo-dimethanol (NB-dimethanol), 2-hydroxyethyl bicyclo[2.2.1]hept-5-ene-2-carboxylate (NB-epoxide), norbornene triethoxy silane (NB-triethoxysilane), 5-(perfluorobutyl)bicyclo[2.2.1]hept-2-ene (NB-Fluorocarbon (1)), bicyclo[2.2.1]hept-5-ene-2-carboxylic acid, 1,1,2,2,3,3,4,4,5,5,6,6-dodecafluorohexyl ester (NB-fluorocarbon (2)), bicyclo[2.2.1]hept-5-ene-2-carboxylic acid, 2,2,2-trifluoro-1-(trifluoromethyl)ethyl ester (NB-fluorocarbon (3)), or a mixture thereof; and

the cyclic olefin monomer of **formula (III)** is dicyclopentadiene (DCPD), tricyclopentadiene (TCPD), tetracyclopentadene (TeCPD), or a mixture thereof.

5. The composition of any one of claims 2-4, wherein

the cyclic olefin monomer of **formula (II)** is 5-ethylidene-2-norbornene (ENB), 5-octyl-2-norbornene (ONB), , or a mixture thereof; and

the cyclic olefin monomer of **formula (III)** is dicyclopentadiene (DCPD), tricyclopentadiene (TCPD), tetracyclopentadene (TeCPD), or a mixture thereof.

6. The composition of any one of claims 1-5, wherein the thermoplastic hydrocarbon resin is selected from the group consisting of pure monomer thermoplastic resin (PMR), C5 thermoplastic resin, C5/C9 thermoplastic resin, C9 thermoplastic resin, terpene thermoplastic resin, indene-coumarone (IC) thermoplastic resin, dicyclopentadiene (DCPD) thermoplastic resin, hydrogenated or partially hydrogenated pure monomer (PMR) thermoplastic resin, hydrogenated or partially hydrogenated C5 thermoplastic resin, hydrogenated or partially hydrogenated C5/C9 thermoplastic resin, hydrogenated or partially hydrogenated C9 thermoplastic resin, hydrogenated or partially hydrogenated dicyclopentadiene (DCPD)

thermoplastic resin, terpene thermoplastic resin, modified indene-coumarone (IC) thermoplastic resin, and mixtures thereof.

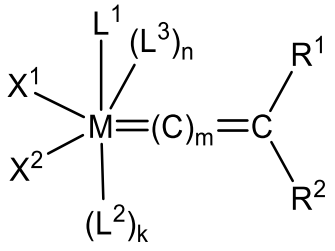
7. The composition of claim 6, wherein the thermoplastic hydrocarbon resin is selected from the group consisting of PB-100, Nevchem® 100, LX®-2181, Nevchem® 140, Escorez™ 5600, and mixtures thereof.

8. The composition of any one of claims 1-7, wherein:

the at least one cyclic olefin monomer is present in the composition in an amount ranging from about 0.1 – 99.9 wt.% ~~(e.g., about 0.5 – 99.5 wt.%, 1 – 99 wt.%, 5 – 95 wt.%, 10 – 90 wt.%, 20 – 80 wt.%, 30 – 70 wt.%, 40 – 60 wt.%, 45 – 55 wt.%) or about 50 wt.%~~, based on the total weight of the composition, and

the at least one thermoplastic hydrocarbon resin is present in the composition in an amount ranging from about 99.9 – 0.1 wt.% ~~(e.g., about 99.5 – 0.5 wt.%, 99 – 1 wt.%, 95 – 5 wt.%, 90 – 10 wt.%, 80 – 20 wt.%, 70 – 30 wt.%, 60 – 40 wt.%, 55 – 45 wt.%) or about 50 wt.%~~, based on the total weight of the composition.

9. The composition of any one of claims 1-8, wherein the at least one olefin metathesis catalyst has the structure of **Formula (1)**:



Formula (1),

wherein:

M is ruthenium;

L^1, L^2, and L^3 are independently neutral electron donor ligands;

n is 0 or 1;

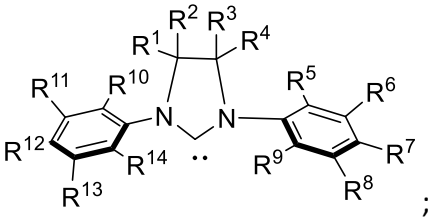
m is 0, 1, or 2;

k is 0 or 1;

X^1 and X^2 are independently anionic ligands; and

R^1 and R^2 are independently hydrogen, optionally substituted hydrocarbyl, optionally substituted heteroatom-containing hydrocarbyl; or R^1 and R^2 are linked together to form one or more cyclic groups.

10. The composition of claim 9, wherein:

L^1 is ;

R^1 is H, optionally substituted $C_{1\text{-}24}$ alkyl, halogen, $-C(O)R^{25}$, $-OR^{26}$, CN, $-NR^{27}R^{28}$, NO_2, $-CF_3$, $-S(O)_xR^{29}$, $-P(O)(OH)_2$, $-OP(O)(OH)_2$, $-SR^{31}$, optionally substituted heterocycle, optionally substituted $C_{3\text{-}10}$ cycloalkyl, optionally substituted $C_{5\text{-}24}$ aryl, optionally substituted $C_{3\text{-}8}$ cycloalkenyl, or together with R^2 can form a spiro compound, or together with R^3 or together with R^4 can form a polycyclic ring;

R^2 is H, optionally substituted $C_{1\text{-}24}$ alkyl, halogen, $-C(O)R^{25}$, $-OR^{26}$, CN, $-NR^{27}R^{28}$, $-NO_2$, $-CF_3$, $-S(O)_xR^{29}$, $-P(O)(OH)_2$, $-OP(O)(OH)_2$, $-SR^{31}$, optionally substituted heterocycle, optionally substituted $C_{3\text{-}10}$ cycloalkyl, optionally substituted $C_{5\text{-}24}$ aryl, optionally substituted $C_{3\text{-}8}$ cycloalkenyl or together with R^1 can form a spiro compound, or together with R^3 or together with R^4 can form a polycyclic ring;

R^3 is H, optionally substituted $C_{1\text{-}24}$ alkyl, halogen, $-C(O)R^{25}$, $-OR^{26}$, CN, $-NR^{27}R^{28}$, NO_2, $-CF_3$, $-S(O)_xR^{29}$, $-P(O)(OH)_2$, $-OP(O)(OH)_2$, $-SR^{31}$, optionally substituted heterocycle, optionally substituted $C_{3\text{-}10}$ cycloalkyl, optionally substituted $C_{5\text{-}24}$ aryl, optionally substituted $C_{3\text{-}8}$ cycloalkenyl, or together with R^2 or together with R^1 can form a polycyclic ring, or together with R^4 can form a spiro compound;

R^4 is H, optionally substituted $C_{1\text{-}24}$ alkyl, halogen, $-C(O)R^{25}$, $-OR^{26}$, -CN, $-NR^{27}R^{28}$, $-NO_2$, $-CF_3$, $-S(O)_xR^{29}$, $-P(O)(OH)_2$, $-OP(O)(OH)_2$, $-SR^{31}$, optionally substituted heterocycle, optionally

substituted C_{3-10} cycloalkyl, optionally substituted C_{5-24} aryl, optionally substituted C_{3-8} cycloalkenyl, or together with R^3 can form a spiro compound, or together with R^2 or together with R^1 can form a polycyclic ring;

R^5 is H, optionally substituted C_{1-24} alkyl, halogen, $-C(O)R^{25}$, $-OR^{26}$, CN, $-NR^{27}R^{28}$, $-NO_2$, $-CF_3$, $-S(O)_xR^{29}$, $-P(O)(OH)_2$, $-OP(O)(OH)_2$, $-SR^{31}$, optionally substituted heterocycle, optionally substituted C_{3-10} cycloalkyl, optionally substituted C_{5-24} aryl, optionally substituted C_{3-8} cycloalkenyl, or together with R^6 can form an optionally substituted polycyclic ring;

R^6 is H, optionally substituted C_{1-24} alkyl, halogen, $-C(O)R^{25}$, $-OR^{26}$, $-CN$, $-NR^{27}R^{28}$, $-NO_2$, $-CF_3$, $-S(O)_xR^{29}$, $-P(O)(OH)_2$, $-OP(O)(OH)_2$, $-SR^{31}$, optionally substituted heterocycle, optionally substituted C_{3-10} cycloalkyl, optionally substituted C_{5-24} aryl, optionally substituted C_{3-8} cycloalkenyl, or together with R^5 or together with R^7 can form an optionally substituted polycyclic ring;

R^7 is H, optionally substituted C_{1-24} alkyl, halogen, $-C(O)R^{25}$, $-OR^{26}$, $-CN$, $-NR^{27}R^{28}$, $-NO_2$, $-CF_3$, $-S(O)_xR^{29}$, $-P(O)(OH)_2$, $-OP(O)(OH)_2$, $-SR^{31}$, optionally substituted heterocycle, optionally substituted C_{3-10} cycloalkyl, optionally substituted C_{5-24} aryl optionally substituted C_{3-8} cycloalkenyl, or together with R^6 or together with R^8 can form an optionally substituted polycyclic ring;

R^8 is H, optionally substituted C_{1-24} alkyl, halogen, $-C(O)R^{25}$, $-OR^{26}$, $-CN$, $-NR^{27}R^{28}$, $-NO_2$, $-CF_3$, $-S(O)_xR^{29}$, $-P(O)(OH)_2$, $-OP(O)(OH)_2$, $-SR^{31}$, optionally substituted heterocycle, optionally substituted C_{3-10} cycloalkyl, optionally substituted C_{5-24} aryl, optionally substituted C_{3-8} cycloalkenyl, or together with R^7 or together with R^9 can form an optionally substituted polycyclic ring;

R^9 is H, optionally substituted C_{1-24} alkyl, halogen, $-C(O)R^{25}$, $-OR^{26}$, CN, $-NR^{27}R^{28}$, NO_2, $-CF_3$, $-S(O)_xR^{29}$, $-P(O)(OH)_2$, $-OP(O)(OH)_2$, $-SR^{31}$, optionally substituted heterocycle, optionally substituted C_{3-10} cycloalkyl, optionally substituted C_{5-24} aryl, optionally substituted C_{3-8} cycloalkenyl, or together with R^8 can form an optionally substituted polycyclic ring;

R^{10} is H, optionally substituted C_{1-24} alkyl, halogen, $-C(O)R^{25}$, $-OR^{26}$, $-CN$, $-NR^{27}R^{28}$, $-NO_2$, $-CF_3$, $-S(O)_xR^{29}$, $-P(O)(OH)_2$, $-OP(O)(OH)_2$, $-SR^{31}$, optionally substituted heterocycle, optionally

substituted C_{3-10} cycloalkyl, optionally substituted C_{5-24} aryl, optionally substituted C_{3-8} cycloalkenyl, or together with R^{11} can form an optionally substituted polycyclic ring;

R^{11} is H, optionally substituted C_{1-24} alkyl, halogen, $-C(O)R^{25}$, $-OR^{26}$, -CN, $-NR^{27}R^{28}$, $-NO_2$, $-CF_3$, $-S(O)_xR^{29}$, $-P(O)(OH)_2$, $-OP(O)(OH)_2$, $-SR^{31}$, optionally substituted heterocycle, optionally substituted C_{3-10} cycloalkyl, optionally substituted C_{5-24} aryl, optionally substituted C_{3-8} cycloalkenyl, or together with R^{10} or together with R^{12} can form an optionally substituted polycyclic ring;

R^{12} is H, optionally substituted C_{1-24} alkyl, halogen, $-C(O)R^{25}$, $-OR^{26}$, -CN, $-NR^{27}R^{28}$, $-NO_2$, $-CF_3$, $-S(O)_xR^{29}$, $-P(O)(OH)_2$, $-OP(O)(OH)_2$, $-SR^{31}$, optionally substituted heterocycle, optionally substituted C_{3-10} cycloalkyl, optionally substituted C_{5-24} aryl, optionally substituted C_{3-8} cycloalkenyl, or together with R^{11} or together with R^{13} can form an optionally substituted polycyclic ring;

R^{13} is H, optionally substituted C_{1-24} alkyl, halogen, $-C(O)R^{25}$, $-OR^{26}$, -CN, $-NR^{27}R^{28}$, $-NO_2$, $-CF_3$, $-S(O)_xR^{29}$, $-P(O)(OH)_2$, $-OP(O)(OH)_2$, $-SR^{31}$, optionally substituted heterocycle, optionally substituted C_{3-10} cycloalkyl, optionally substituted C_{5-24} aryl, optionally substituted C_{3-8} cycloalkenyl, or together with R^{14} or together with R^{12} can form an optionally substituted polycyclic ring;

R^{14} is H, optionally substituted C_{1-24} alkyl, halogen, $-C(O)R^{25}$, $-OR^{26}$, -CN, $-NR^{27}R^{28}$, $-NO_2$, $-CF_3$, $-S(O)_xR^{29}$, $-P(O)(OH)_2$, $-OP(O)(OH)_2$, $-SR^{31}$, optionally substituted heterocycle, optionally substituted C_{3-10} cycloalkyl, optionally substituted C_{5-24} aryl, optionally substituted C_{3-8} cycloalkenyl, or together with R^{13} can form a polycyclic ring;

R^{25} is -OH, $-OR^{30}$, $-NR^{27}R^{28}$, optionally substituted C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-8} cycloalkenyl;

R^{26} is H, optionally substituted C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-8} cycloalkenyl;

R^{27} is H, optionally substituted C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-8} cycloalkenyl;

R^{28} is H, optionally substituted C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-8} cycloalkenyl;

R^{29} is H, optionally substituted C_{1-24} alkyl, $-OR^{26}$, $-NR^{27}R^{28}$, optionally substituted heterocycle, optionally substituted C_{3-10} cycloalkyl, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-8} cycloalkenyl;

R^{30} is optionally substituted C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-8} cycloalkenyl;

R^{31} is H, optionally substituted C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-8} cycloalkenyl; and

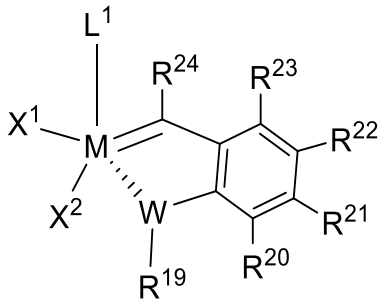
x is 1 or 2.

11. The composition of claim 9 or claim 10, wherein L^1 and/or L^2 is $PR^{H1}R^{H2}R^{H3}$ wherein: R^{H1}, R^{H2}, and R^{H3} are each independently optionally substituted C_6-C_{10} aryl, optionally substituted C_1-C_{10} alkyl, or optionally substituted C_3-C_{10} cycloalkyl.

12. The composition of any one of claims 9-11, wherein: R^1 is hydrogen and R^2 is phenyl; or R^1 is hydrogen and R^2 is 3-methyl-1-propenyl; or R^1 and R^2 are linked together to form 3-phenylindenylid-1-ene.

13. The composition of claim 12, wherein: R^{H1} is phenyl, ethyl, or cyclohexyl, R^{H2} is phenyl or cyclohexyl, and R^{H3} is phenyl, ethyl, or cyclohexyl.

14. The composition of any one of claims 1-8, wherein the at least one olefin metathesis catalyst has the structure of **Formula (2)**:



Formula (2)

wherein:

M is ruthenium;

L^1 is a neutral electron donor ligand;

X^1 and X^2 are independently anionic ligands;

W is O, halogen, NR^{33} or S;

R^{19} is H, optionally substituted C_{1-24} alkyl, $-C(R^{34})(R^{35})COOR^{36}$, $-C(R^{34})(R^{35})C(O)H$, $-C(R^{34})(R^{35})C(O)R^{37}$, $-C(R^{34})(R^{35})CR^{38}(OR^{39})(OR^{40})$, $-C(R^{34})(R^{35})C(O)NR^{41}R^{42}$, $-C(R^{34})(R^{35})C(O)NR^{41}OR^{40}$, $-C(O)R^{25}$, optionally substituted heterocycle, optionally substituted C_{3-10} cycloalkyl, optionally substituted C_{5-24} aryl, optionally substituted C_{3-8} cycloalkenyl, or when W is NR^{33}, then R^{19} together with R^{33} can form an optionally substituted heterocyclic ring or when W is halogen then R^{19} is nil;

R^{20} is H, optionally substituted C_{1-24} alkyl, halogen, $-C(O)R^{25}$, $-OR^{26}$, CN, $-NR^{27}R^{28}$, NO_2, $-CF_3$, $–S(O)_xR^{29}$, $-P(O)(OH)_2$, $-OP(O)(OH)_2$, $-SR^{31}$, optionally substituted heterocycle, optionally substituted C_{3-10} cycloalkyl, optionally substituted C_{5-24} aryl, optionally substituted C_{3-8} cycloalkenyl, or together with R^{21} can form a polycyclic ring;

R^{21} is H, optionally substituted C_{1-24} alkyl, halogen, $-C(O)R^{25}$, $-OR^{26}$, CN, $-NR^{27}R^{28}$, NO_2, $-CF_3$, $–S(O)_xR^{29}$, $-P(O)(OH)_2$, $-OP(O)(OH)_2$, $-SR^{31}$, optionally substituted heterocycle, optionally substituted C_{3-10} cycloalkyl, optionally substituted C_{5-24} aryl, optionally substituted C_{3-8} cycloalkenyl, or together with R^{20} or together with R^{22} can form a polycyclic ring;

R^{22} is H, optionally substituted C_{1-24} alkyl, halogen, $-C(O)R^{25}$, $-OR^{26}$, CN, $-NR^{27}R^{28}$, NO_2, $-CF_3$, $–S(O)_xR^{29}$, $-P(O)(OH)_2$, $-OP(O)(OH)_2$, $-SR^{31}$, optionally substituted heterocycle, optionally

substituted C_{3-10} cycloalkyl, optionally substituted C_{5-24} aryl, optionally substituted C_{3-8} cycloalkenyl, or together with R^{21} or together with R^{23} can form a polycyclic ring;

R^{23} is H, optionally substituted C_{1-24} alkyl, halogen, -C(O)R^{25}, -OR^{26}, CN, -$NR^{27}R^{28}$, NO_2, -CF_3, –$S(O)_xR^{29}$, -P(O)$(OH)_2$, -OP(O)$(OH)_2$, -SR^{31}, optionally substituted heterocycle, optionally substituted C_{3-10} cycloalkyl, optionally substituted C_{5-24} aryl, optionally substituted C_{3-8} cycloalkenyl, or together with R^{22} can form a polycyclic ring;

R^{24} is H, optionally substituted C_{1-24} alkyl, halogen, -C(O)R^{25}, -OR^{26}, CN, -$NR^{27}R^{28}$, NO_2, -CF_3, –$S(O)_xR^{29}$, -P(O)$(OH)_2$, -OP(O)$(OH)_2$, -SR^{31}, optionally substituted heterocycle, optionally substituted C_{3-10} cycloalkyl, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-8} cycloalkenyl;

R^{25} is OH, OR^{30}, $NR^{27}R^{28}$, optionally substituted C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-8} cycloalkenyl;

R^{26} is H, optionally substituted C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-8} cycloalkenyl;

R^{27} is H, optionally substituted C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-8} cycloalkenyl;

R^{28} is H, optionally substituted C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-8} cycloalkenyl;

R^{29} is H, optionally substituted C_{1-24} alkyl, OR^{26}, -$NR^{27}R^{28}$, optionally substituted heterocycle, optionally substituted C_{3-10} cycloalkyl, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-8} cycloalkenyl;

R^{30} is optionally substituted C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-8} cycloalkenyl;

R^{31} is H, optionally substituted C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally

substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-8} cycloalkenyl;

R^{33} is H, optionally substituted C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-8} cycloalkenyl;

R^{34} is H, optionally substituted C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-8} cycloalkenyl;

R^{35} is H, optionally substituted C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-8} cycloalkenyl;

R^{36} is H, optionally substituted C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-8} cycloalkenyl;

R^{37} is optionally substituted C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-8} cycloalkenyl;

R^{38} is H, optionally substituted C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-8} cycloalkenyl;

R^{39} is H, optionally substituted C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-8} cycloalkenyl;

R^{40} is H, optionally substituted C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-8} cycloalkenyl;

R^{41} is H, optionally substituted C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-8} cycloalkenyl;

R^{42} is H, optionally substituted C_{1-24} alkyl, optionally substituted C_{3-10} cycloalkyl, optionally substituted heterocycle, optionally substituted C_{5-24} aryl, or optionally substituted C_{3-8} cycloalkenyl; and

x is 1 or 2.

15. The composition of claim 14, wherein:

M is ruthenium;

L^1 is a neutral electron donor ligand;

X^1 and X^2 are independently anionic ligands;

W is O;

R^{19} is H, methyl, ethyl, *n*-propyl, *iso*-propyl, *n*-butyl, *tert*-butyl, cyclohexyl, cyclopentyl, or phenyl;

R^{20} is H, methyl, ethyl, *n*-propyl, *iso*-propyl, *n*-butyl, *tert*-butyl, cyclohexyl, cyclopentyl, or phenyl;

R^{21} is H, optionally substituted C_{1-24} alkyl, halogen, -C(O)R^{25}, -OR^{26}, CN, -$NR^{27}R^{28}$, NO_2, -CF_3, –$S(O)_xR^{29}$, -$P(O)(OH)_2$, -$OP(O)(OH)_2$, -SR^{31}, optionally substituted heterocycle, optionally substituted C_{3-10} cycloalkyl, optionally substituted C_{5-24} aryl, optionally substituted C_{3-8} cycloalkenyl, or together with R^{20} or together with R^{22} can form a polycyclic ring;

R^{22} is H, methyl, ethyl, *n*-propyl, *iso*-propyl, *n*-butyl, *tert*-butyl, cyclohexyl, cyclopentyl, or phenyl.;

R^{23} is H, methyl, ethyl, *n*-propyl, *iso*-propyl, *n*-butyl, *tert*-butyl, cyclohexyl, cyclopentyl, or phenyl;

R^{24} is H, methyl, ethyl, *n*-propyl, *iso*-propyl, *n*-butyl, *tert*-butyl, cyclohexyl, cyclopentyl, or phenyl;

R^{25} is OH, OR^{30}, $NR^{27}R^{28}$, methyl, ethyl, *n*-propyl, *iso*-propyl, *n*-butyl, *tert*-butyl, cyclohexyl, cyclopentyl, or phenyl;

R^{26} is H, methyl, ethyl, *n*-propyl, *iso*-propyl, *n*-butyl, *tert*-butyl, cyclohexyl, cyclopentyl, or phenyl;

R^{27} is H, methyl, ethyl, *n*-propyl, *iso*-propyl, *n*-butyl, *tert*-butyl, cyclohexyl, cyclopentyl, or

phenyl;

R^{28} is H, methyl, ethyl, *n*-propyl, *iso*-propyl, *n*-butyl, *tert*-butyl, cyclohexyl, cyclopentyl, or phenyl;

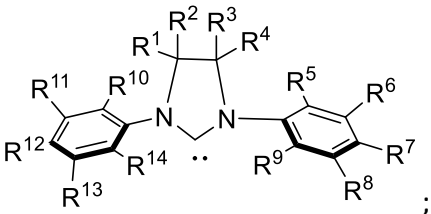
R^{29} is H, methyl, ethyl, *n*-propyl, *iso*-propyl, *n*-butyl, *tert*-butyl, OR^{26}, $-NR^{27}R^{28}$, cyclohexyl, cyclopentyl, or phenyl;

R^{30} is methyl, ethyl, *n*-propyl, *iso*-propyl, *n*-butyl, *tert*-butyl, cyclohexyl, cyclopentyl, or phenyl;

R^{31} is H, methyl, ethyl, *n*-propyl, *iso*-propyl, *n*-butyl, *tert*-butyl, cyclohexyl, cyclopentyl, or phenyl; and

x is 1 or 2.

16. The composition of claim 14 or claim 15, wherein:

L^1 is  ;

R^1 is H, phenyl, methyl, ethyl, iso-propyl, n-propyl, n-butyl, tert-butyl, or sec-butyl;

R^2 is H, phenyl, methyl, ethyl, iso-propyl, n-propyl, n-butyl, tert-butyl, or sec-butyl;

R^3 is H, phenyl, methyl, ethyl, iso-propyl, n-propyl, n-butyl, tert-butyl, or sec-butyl;

R^4 is H, phenyl, methyl, ethyl, iso-propyl, n-propyl, n-butyl, tert-butyl, or sec-butyl;

R^5 is H, methyl, ethyl, iso-propyl, n-propyl, n-butyl, tert-butyl, sec-butyl, F, optionally substituted phenyl, or together with R^6 can form an optionally substituted polycyclic ring;

R^6 is H, methyl, ethyl, iso-propyl, n-propyl, n-butyl, tert-butyl, sec-butyl, F, optionally substituted phenyl, or together with R^5 or together with R^7 can form an optionally substituted polycyclic ring;

R^7 is H, methyl, ethyl, iso-propyl, n-propyl, n-butyl, tert-butyl, sec-butyl, optionally substituted phenyl, or together with R^6 or together with R^8 can form an optionally substituted polycyclic ring;

R^8 is H, methyl, ethyl, iso-propyl, n-propyl, n-butyl, tert-butyl, sec-butyl, optionally substituted phenyl, or together with R^7 or together with R^9 can form an optionally substituted polycyclic ring;

R^9 is H, methyl, ethyl, iso-propyl, n-propyl, n-butyl, tert-butyl, sec-butyl, F, optionally substituted phenyl, or together with R^8 can form a polycyclic ring;

R^{10} is H, methyl, ethyl, iso-propyl, n-propyl, n-butyl, tert-butyl, sec-butyl, optionally substituted phenyl, or together with R^{11} can form an optionally substituted polycyclic ring;

R^{11} is H, methyl, ethyl, iso-propyl, n-propyl, n-butyl, tert-butyl, sec-butyl, optionally substituted phenyl, or together with R^{10} or together with R^2 can form an optionally substituted polycyclic ring;

R^{12} is H, methyl, ethyl, iso-propyl, n-propyl, n-butyl, tert-butyl, sec-butyl, F, optionally substituted phenyl, or together with R^{11} or together with R^{13} can form a polycyclic ring;

R^{13} is H, methyl, ethyl, iso-propyl, n-propyl, n-butyl, tert-butyl, sec-butyl, F, optionally substituted phenyl, or together with R^{12} or together with R^{14} can form an optionally substituted polycyclic ring;

R^{14} is H, methyl, ethyl, iso-propyl, n-propyl, n-butyl, tert-butyl, sec-butyl, optionally substituted phenyl, or together with R^{13} can form an optionally substituted polycyclic ring.

R^{19} is H, methyl, ethyl, *n*-propyl, *iso*-propyl, *n*-butyl, *tert*-butyl, cyclohexyl, cyclopentyl, or phenyl;

R^{20} is H, methyl, ethyl, *n*-propyl, *iso*-propyl, *n*-butyl, *tert*-butyl, cyclohexyl, cyclopentyl, or phenyl;

R^{21} is H, optionally substituted $C_{1\text{-}24}$ alkyl, halogen, $-C(O)R^{25}$, $-OR^{26}$, CN, $-NR^{27}R^{28}$, NO_2, $-CF_3$, $-S(O)_xR^{29}$, $-P(O)(OH)_2$, $-OP(O)(OH)_2$, $-SR^{31}$, optionally substituted heterocycle, optionally substituted $C_{3\text{-}10}$ cycloalkyl, optionally substituted $C_{5\text{-}24}$ aryl, optionally substituted $C_{3\text{-}8}$ cycloalkenyl, or together with R^{20} or together with R^{22} can form a polycyclic ring;

R^{22} is H, methyl, ethyl, *n*-propyl, *iso*-propyl, *n*-butyl, *tert*-butyl, cyclohexyl, cyclopentyl, or phenyl;

R^{23} is H, methyl, ethyl, *n*-propyl, *iso*-propyl, *n*-butyl, *tert*-butyl, cyclohexyl, cyclopentyl or phenyl;

R^{24} is H, methyl, ethyl, *n*-propyl, *iso*-propyl, *n*-butyl, *tert*-butyl, cyclohexyl, cyclopentyl, or phenyl;

R^{25} is OH, OR^{30}, $NR^{27}R^{28}$, methyl, ethyl, *n*-propyl, *iso*-propyl, *n*-butyl, *tert*-butyl, cyclohexyl, cyclopentyl, or phenyl;

R^{26} is H, methyl, ethyl, *n*-propyl, *iso*-propyl, *n*-butyl, *tert*-butyl, cyclohexyl, cyclopentyl, or phenyl;

R^{27} is H, methyl, ethyl, *n*-propyl, *iso*-propyl, *n*-butyl, *tert*-butyl, cyclohexyl, cyclopentyl, or phenyl;

R^{28} is H, methyl, ethyl, *n*-propyl, *iso*-propyl, *n*-butyl, *tert*-butyl, cyclohexyl, cyclopentyl, or phenyl;

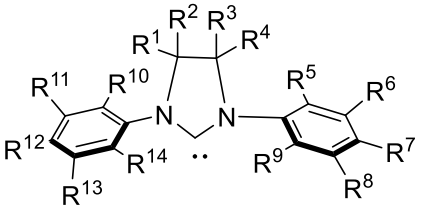
R^{29} is H, methyl, ethyl, *n*-propyl, *iso*-propyl, *n*-butyl, *tert*-butyl, OR^{26}, $-NR^{27}R^{28}$, cyclohexyl, cyclopentyl, or phenyl;

R^{30} is methyl, ethyl, *n*-propyl, *iso*-propyl, *n*-butyl, *tert*-butyl, cyclohexyl, cyclopentyl, or phenyl;

R^{31} is H, methyl, ethyl, *n*-propyl, *iso*-propyl, *n*-butyl, *tert*-butyl, cyclohexyl, cyclopentyl, or phenyl; and

x is 1 or 2.

17. The composition of any one of claims 14-16, wherein:

L^1 is ;

R^1 is H;

R^2 is H;

R^3 is H;

R^4 is H;

R^5 is H, methyl, or iso-propyl;

R^6 is H;

R^7 is H or methyl;

R^8 is H;

R^9 is H, methyl, or iso-propyl;

R^{10} is H, methyl, or iso-propyl;

R^{11} is H;

R^{12} is H or methyl;

R^{13} is H;

R^{14} is H, methyl, or iso-propyl;

X^1 and X^2 are Cl;

W is O;

R^{19} is iso-propyl;

R^{20} is H;

R^{21} is H;

R^{22} is H;

R^{23} is H; and

R^{24} is H.

18. The composition of any one of claims 1-17, further comprising at least one adhesion promoter composition.

19. The composition of claim 18, where the at least one adhesion promoter composition comprises at least one compound containing at least two isocyanate groups.

20. The composition of claim 19, where the at least one compound containing at least two isocyanate groups is selected from the group consisting of a diisocyanate, a triisocyanate, and a polyisocyanate.

21. The composition of claim 20, wherein the at least one compound containing at least two isocyanate groups is selected from the group consisting of a toluene diisocyanate;

tetramethylxylene diisocyanate (TMXDI); methylene diphenyl diisocyanate (MDI); a mixture of the three MDI isomers 2.2'-MDI, 2,4'-MDI, and 4,4'-MDI; liquid MDI; solid MDI; hexamethylenediisocyanatetrimer (HDIt); hexamethylenediisocyanate (HDI); isophorone diisocyanate (IPDI); 4,4'-methylene bis(cyclohexyl isocyanate) (H12MDI); polymeric MDI (PM200); MDI prepolymer; and liquid carbodiimide modified 4,4'-MDI.

22. The composition of claim 21, wherein the at least one compound containing at least two isocyanate groups is 4,4'-methylene diphenyl diisocyanate (MDI).

23. The composition of claims 18-22, wherein the at least one adhesion promoter further comprises at least one compound containing at least one heteroatom-containing functional group and at least one metathesis-active olefin.

24. The composition of claim 23, wherein the compound containing a heteroatom-containing functional group and a metathesis-active olefin is selected from the group consisting of 5-norbornene-2-methanol (NB-MeOH); 2-hydroxyethyl bicyclo[2.2.1]hept-2-ene-5-carboxylate (HENB); and allyl alcohol.

25. The composition of claim 23 or claim 24, wherein the compound containing a heteroatom-containing functional group and a metathesis-active olefin is reacted with the at least one compound containing at least two isocyanate groups.

26. The composition of claim 18, where the at least one adhesion promoter composition comprises at least one organofunctional silane compound.

27. The composition of claim 26, wherein the at least one organofunctional silane compound is (5-bicyclo[2.2.1]hept-2-enyl)triethoxysilane or [3-(triethoxysilyl)propyl]-bicyclo[2.2.1]hept-5-en-2-ylmethyl ester.

28. The composition of any one of claims 18-27, wherein the at least one adhesion promoter composition is present in an amount ranging from 0.1 – 10 phr ~~(e.g., 0.5 – 9.5 phr, 1 – 9 phr, 2 – 8 phr, 3 – 7 phr, 4 – 6 phr) or about 1 phr, 2, phr, 3 phr, 4 phr, 5 phr, 6 phr, 7 phr, 8 phr, 9 phr, or 10 phr~~.

29. The composition of any one of claims 1-28, further comprising at least one substrate.

30. The composition of claim 29, wherein the substrate is a metal substrate or a non-metal substrate.

31. The composition of claim 29, wherein the substrate is a plastic or polymer substrate, a polymer-coated substrate, a glass fiber substrate, a carbon fiber substrate, a natural fiber substrate, or a metal oxide substrate.

32. The composition of any one of claims 1-31, further comprising at least one additive.

33. The composition of claim 32, wherein the at least one additive is selected from the group consisting of a gel modifier, a hardness modulator, an impact modifier, a cure rate inhibitor, a pot-life controller, an antioxidant, an antiozonant, a filler, a binder, a thixotrope, a rheology modifier, a dispersant, a wetting agent, a plasticizer, a pigment, a flame retardant, a dye, fibers, a reinforcement material, a coupling agent, a UV absorber, a UV light stabilizer, a film former, a lubricant, and mixtures thereof.

34. The composition of claim 33, wherein the cure rate inhibitor is triphenyl phosphine (TPP).

35. The composition of claim 33, wherein the antioxidant is selected from the group consisting of butylated hydroxytoluene (BHT), Ethanox®, and mixtures thereof.

36. The composition of claim 33, wherein the pot-life controller is vinyl norbornene (VNB).

37. The composition of any one of claims 1-36, further comprising at least one curing agent.

38. The composition of claim 37, wherein the at least one curing agent is selected from the group consisting of an organometallic complex, a free radical initiator, and a cationic initiator.

39. An article of manufacture, comprising the composition of any one of claims 1-38.

40. A method of making a molded article, comprising:

forming a resin composition comprising the composition of any one of claims 1-38,

contacting the resin composition with at least one substrate, and

subjecting the resin composition to conditions effective to promote an olefin metathesis reaction of the at least one cyclic olefin monomer.

41. The method of claim 40, wherein the molded article has a tensile modulus > 2400 MPa ~~(e.g., > 2600 MPa, > 2800 MPa, > 3000 MPa, or > 3200 MPa)~~.

42. The method of claim 40, wherein the molded article has a higher tensile modulus ~~(e.g., > 2%, > 3%, > 4%, > 5%, > 6%, > 7%, > 8%, > 9%, > 10%, > 12%, > 14%, > 16%, > 18%, > 20%)~~ as compared to a comparable molded article, wherein the composition of the molded article of the invention and the comparable molded article are equivalent except the comparable molded article does not contain the thermoplastic hydrocarbon resin.

43. A coating composition, comprising the composition of any one of claims 1-38.

44. A method for coating at least one substrate, comprising:

optionally applying an adhesion promoter onto at least a portion of a surface of the at least one substrate;

applying onto the at least portion of the surface of the at least one substrate a composition comprising the composition of any one of claims 1-38; and

curing the coating applied to the substrate surface.

45. An article of manufacture, comprising the at least one coated substrate of claim 44.

46. The article of manufacture of claim 45, wherein the substrate is a metal surface.

47. The article of manufacture of claim 45, wherein the substrate is a nonmetal surface.

48. An adhesive composition, comprising the composition of any one of claims 1-38.

49. A cured article of manufacture, comprising the composition of any one of claims 1-38.

50. The cured article of manufacture of claim 49, wherein the article does not contain a reinforcement material.

51. The cured article of manufacture of claim 49, wherein the reinforcement material is a substrate.