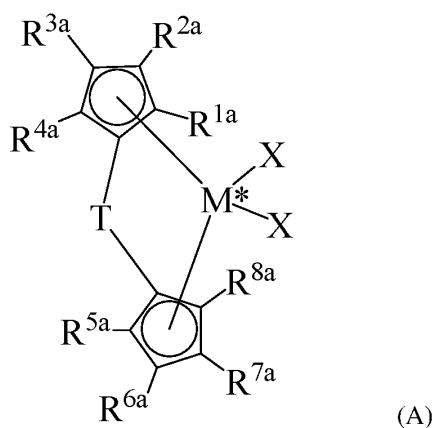


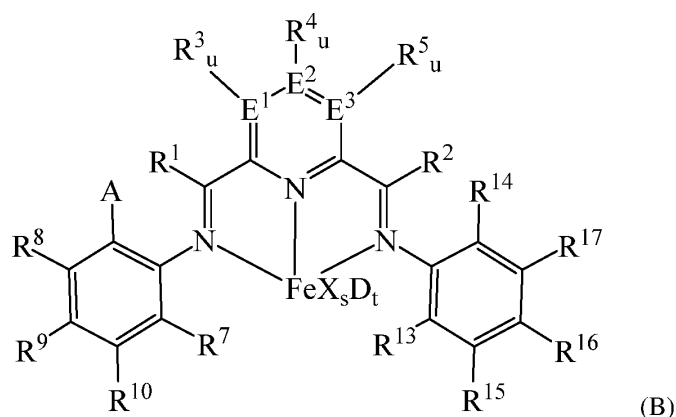
CLAIMS

What is claimed is:

1. A supported catalyst system comprising:
a bridged group 4 metallocene catalyst;
5 an iron catalyst;
a support material; and
an activator; wherein the bridged group 4 metallocene compound is represented by the formula (A):



- 10 where
M* is a group 4 metal;
each of R^{1a}, R^{2a}, and R^{4a} is independently hydrogen, alkoxide or C₁ to C₄₀ substituted or unsubstituted hydrocarbyl;
R^{3a} is independently hydrogen, alkoxide, C₁ to C₄₀ substituted or unsubstituted hydrocarbyl, or
15 –R^{9a}-SiR'₃ or –R^{9a}-CR'₃ where R^{9a} is C₁ to C₄ hydrocarbyl, and each R' is independently C₁ to C₂₀ substituted or unsubstituted hydrocarbyl and at least one R' is C₁ to C₂₀ substituted or unsubstituted hydrocarbyl;
each of R^{5a}, R^{6a}, and R^{8a} is independently hydrogen, halide, alkoxide or C₁ to C₄₀ substituted or unsubstituted hydrocarbyl;
20 R^{7a} is –R^{9a}-SiR'₃ or –R^{9a}-CR'₃ where R^{9a} is C₁ to C₄ hydrocarbyl, and each R' is independently C₁ to C₂₀ substituted or unsubstituted hydrocarbyl, and at least one R' is H;
T is a bridging group; and
each X is independently a univalent anionic ligand, a diene ligand, an alkylidene ligand, or two Xs are joined to form a metallocyclic ring;
25 and the iron complex is represented by formula (B):



wherein:

A is chlorine, bromine, iodine, -CF₃ or -OR¹¹;

each of R¹ and R² is independently hydrogen, C₁-C₂₂-alkyl, C₂-C₂₂-alkenyl, C₆-C₂₂-aryl,
 5 arylalkyl where alkyl has from 1 to 10 carbon atoms and aryl has from 6 to 20 carbon atoms,
 or five-, six- or seven-membered heterocyclyl comprising at least one atom selected from the
 group consisting of N, P, O and S;

wherein each of R¹ and R² is optionally substituted by halogen, -NR¹¹₂, -OR¹¹ or -SiR¹²₃;

wherein R¹ optionally bonds with R³, and R² optionally bonds with R⁵, in each case to
 10 independently form a five-, six- or seven-membered ring;

R⁷ is a C₁-C₂₀ alkyl;

each of R³_u, R⁴_u, R⁵_u, R⁸, R⁹, R¹⁰, R¹⁵, R¹⁶, and R¹⁷ is independently hydrogen, C₁-C₂₂-alkyl,
 C₂-C₂₂-alkenyl, C₆-C₂₂-aryl, arylalkyl where alkyl has from 1 to 10 carbon atoms and aryl has
 from 6 to 20 carbon atoms, -NR¹¹₂, -OR¹¹, halogen, -SiR¹²₃ or five-, six- or seven-membered
 15 heterocyclyl comprising at least one atom selected from the group consisting of N, P, O,
 and S;

wherein R³_u, R⁴_u, R⁵_u, R⁷, R⁸, R⁹, R¹⁰, R¹⁵, R¹⁶, and R¹⁷ are optionally substituted by halogen,
 -NR¹¹₂, -OR¹¹ or -SiR¹²₃;

wherein R³ optionally bonds with R⁴, R⁴ optionally bonds with R⁵, R⁷ optionally bonds with
 20 R¹⁰, R¹⁰ optionally bonds with R⁹, R⁹ optionally bonds with R⁸, R¹⁷ optionally bonds with R¹⁶,
 and R¹⁶ optionally bonds with R¹⁵, in each case to independently form a five-, six- or seven-
 membered carbocyclic or heterocyclic ring, the heterocyclic ring comprising at least one atom
 from the group consisting of N, P, O and S;

R¹³ is C₁-C₂₀-alkyl bonded with the aryl ring via a primary or secondary carbon atom;

25 R¹⁴ is chlorine, bromine, iodine, -CF₃ or -OR¹¹, or C₁-C₂₀-alkyl bonded with the aryl ring;

- each R^{11} is independently hydrogen, C_1 - C_{22} -alkyl, C_2 - C_{22} -alkenyl, C_6 - C_{22} -aryl, arylalkyl where alkyl has from 1 to 10 carbon atoms and aryl has from 6 to 20 carbon atoms, or $-\text{SiR}^{12}_3$, wherein R^{11} is optionally substituted by halogen, or two R^{11} radicals optionally bond to form a five- or six-membered ring;
- 5 each R^{12} is independently hydrogen, C_1 - C_{22} -alkyl, C_2 - C_{22} -alkenyl, C_6 - C_{22} -aryl, arylalkyl where alkyl has from 1 to 10 carbon atoms and aryl has from 6 to 20 carbon atoms, or two R^{12} radicals optionally bond to form a five- or six-membered ring;
- each of E^1 , E^2 , and E^3 is independently carbon, nitrogen or phosphorus;
- each u is independently 0 if E^1 , E^2 , and/or E^3 is nitrogen or phosphorus and is 1 if E^1 , E^2 , and/or
- 10 E^3 is carbon;
- each X is independently fluorine, chlorine, bromine, iodine, hydrogen, C_1 - C_{20} -alkyl, C_2 - C_{10} -alkenyl, C_6 - C_{20} -aryl, arylalkyl where alkyl has from 1 to 10 carbon atoms and aryl has from 6 to 20 carbon atoms, $-\text{NR}^{18}_2$, $-\text{OR}^{18}$, $-\text{SR}^{18}$, $-\text{SO}_3\text{R}^{18}$, $-\text{OC(O)R}^{18}$, $-\text{CN}$, $-\text{SCN}$, β -diketonate, $-\text{CO}$, $-\text{BF}_4^-$, $-\text{PF}_6^-$ or bulky non-coordinating anions, and the radicals X can be bonded with one
- 15 another;
- each R^{18} is independently hydrogen, C_1 - C_{20} -alkyl, C_2 - C_{20} -alkenyl, C_6 - C_{20} -aryl, arylalkyl where alkyl has from 1 to 10 carbon atoms and aryl has from 6 to 20 carbon atoms, or $-\text{SiR}^{19}_3$, wherein R^{18} can be substituted by halogen or nitrogen- or oxygen-containing groups and two R^{18} radicals optionally bond to form a five- or six-membered ring;
- 20 each R^{19} is independently hydrogen, C_1 - C_{20} -alkyl, C_2 - C_{20} -alkenyl, C_6 - C_{20} -aryl or arylalkyl where alkyl has from 1 to 10 carbon atoms and aryl has from 6 to 20 carbon atoms, wherein R^{19} can be substituted by halogen or nitrogen- or oxygen-containing groups or two R^{19} radicals optionally bond to form a five- or six-membered ring;
- s is 1, 2, or 3;
- 25 D is a neutral donor; and
- t is 0 to 2.
2. The supported catalyst system according to claim 1, wherein M^* of formula (A) is Hf or Zr, each R^{1a} , R^{2a} , R^{3a} , and R^{4a} is a C_1 to C_{20} alkyl group and R^{7a} is $-\text{CH}_2\text{SiR}'_3$ or $-\text{CH}_2\text{CR}'_3$
- 30 where R' is C_1 to C_{20} alkyl or aryl.
3. The supported catalyst system according to claim 1 or 2, wherein for the catalyst represented by formula (B):
- each of A and R^{14} is chlorine;

- each of R¹ and R² is methyl;
 each of R³-R⁵ is hydrogen;
 each of R⁷ and R⁹ is methyl;
 each of R⁸ and R¹⁰, and R¹⁵, R¹⁶, R¹⁷ is independently hydrogen, C₁-C₂₂-alkyl, C₂-C₂₂-alkenyl,
 5 C₆-C₂₂-aryl, arylalkyl where alkyl has from 1 to 10 carbon atoms and aryl has from 6 to 20 carbon atoms, -NR¹¹₂, -OR¹¹, halogen, -SiR¹²₃ or five-, six- or seven-membered heterocyclyl comprising at least one atom selected from the group consisting of N, P, O, and S; wherein R⁷, R⁸, R⁹, R¹⁰, R¹⁵, R¹⁶, and R¹⁷ are optionally substituted by halogen, -NR¹¹₂, -OR¹¹ or -SiR¹²₃; and
 10 wherein R⁷ optionally bonds with R¹⁰, R¹⁰ optionally bonds with R⁹, R⁹ optionally bonds with R⁸, R¹⁷ optionally bonds with R¹⁶, and R¹⁶ optionally bonds with R¹⁵, in each case to independently form a five-, six- or seven-membered carbocyclic or heterocyclic ring, the heterocyclic ring comprising at least one atom selected from the group consisting of N, P, O, and S;
 15 R¹³ is independently a C₁-C₃-alkyl bonded with the aryl ring via a primary or secondary carbon atom;
 each R¹¹ is independently hydrogen, C₁-C₂₂-alkyl, C₂-C₂₂-alkenyl, C₆-C₂₂-aryl, arylalkyl where alkyl has from 1 to 10 carbon atoms and aryl has from 6 to 20 carbon atoms, or -SiR¹²₃, wherein R¹¹ is optionally substituted by halogen, or two R¹¹ radicals optionally bond to form a
 20 five- or six-membered ring;
 each R¹² is independently hydrogen, C₁-C₂₂-alkyl, C₂-C₂₂-alkenyl, C₆-C₂₂-aryl or arylalkyl where alkyl has from 1 to 10 carbon atoms and aryl has from 6 to 20 carbon atoms, or two R¹² radicals optionally bond to form a five- or six-membered ring;
 each of E¹, E², and E³ is carbon; and
 25 each u is 1.

4. A supported catalyst system according to claim 1, wherein the bridged metallocene compound is one or more of:
 Rac/meso-Me₂Si(3-Me₃Si-CH₂-Cp)₂HfMe₂; rac-Me₂Si(3-Me₃Si-CH₂-Cp)₂HfMe₂; rac/meso-
 30 Ph₂Si(3-Me₃Si-CH₂-Cp)₂HfMe₂; rac/meso-PhMeSi(3-Me₃Si-CH₂-Cp)₂HfMe₂; rac/meso-(CH₂)₄Si(3-Me₃Si-CH₂-Cp)₂HfMe₂; rac/meso-(CH₂)₃Si(3-Me₃Si-CH₂-Cp)₂HfMe₂;
 Me(H)Si(3-Me₃Si-CH₂-Cp)₂HfMe₂; Ph(H)Si(3-Me₃Si-CH₂-Cp)₂HfMe₂; rac/meso-(biphenyl)₂Si(3-Me₃Si-CH₂-Cp)₂HfMe₂; rac/meso-(F-C₆H₄)₂Si(3-Me₃Si-CH₂-Cp)₂HfMe₂;
 rac/meso-Me₂Ge(3-Me₃Si-CH₂-Cp)₂HfMe₂; rac-Me₂Ge(3-Me₃Si-CH₂-Cp)₂HfMe₂; rac/meso-

Ph₂Ge(3-Me₃Si-CH₂-Cp)₂HfMe₂; Me₂Si(Me₄Cp)(3-Me₃Si-CH₂-Cp)HfMe₂; Ph₂Si(Me₄Cp)(3-Me₃Si-CH₂-Cp)HfMe₂; Me₂Ge(Me₄Cp)(3-Me₃Si-CH₂-Cp)HfMe₂; Ph₂Ge(Me₄Cp)(3-Me₃Si-CH₂-Cp)HfMe₂; PhMeSi(Me₄Cp)(3-Me₃Si-CH₂-Cp)HfMe₂; (CH₂)₃Si(Me₄Cp)(3-Me₃Si-CH₂-Cp)HfMe₂; (CH₂)₄Si(Me₄Cp)(3-Me₃Si-CH₂-Cp)HfMe₂; Et₂Si(Me₄Cp)(3-Me₃Si-CH₂-Cp)HfMe₂; rac/meso-Me₂Si(3-nPrCp)₂HfMe₂; rac/meso-Ph₂Si(3-nPrCp)₂HfMe₂; rac/meso-PhMeSi(3-nPrCp)₂HfMe₂; rac/meso-(CH₂)₄Si(3-nPrCp)₂HfMe₂; rac/meso-(CH₂)₃Si(3-nPrCp)₂HfMe₂; Me(H)Si(3-nPrCp)₂HfMe₂; Ph(H)Si(3-nPrCp)₂HfMe₂; rac/meso-(biphenyl)₂Si(3-nPrCp)₂HfMe₂; rac/meso-(F-C₆H₄)₂Si(3-nPrCp)₂HfMe₂; rac/meso-Me₂Ge(3-nPrCp)₂HfMe₂; rac/meso-Ph₂Ge(3-nPrCp)₂HfMe₂; rac/meso-Me₂Si(3-nBuCp)₂HfMe₂; rac/meso-Ph₂Si(3-nBuCp)₂HfMe₂; rac/meso-PhMeSi(3-nBuCp)₂HfMe₂; rac/meso-(CH₂)₄Si(3-nBuCp)₂HfMe₂; rac/meso-(CH₂)₃Si(3-nBuCp)₂HfMe₂; Me(H)Si(3-nBuCp)₂HfMe₂; Ph(H)Si(3-nBuCp)₂HfMe₂; rac/meso-(biphenyl)₂Si(3-nBuCp)₂HfMe₂; rac/meso-(F-C₆H₄)₂Si(3-nBuCp)₂HfMe₂; rac/meso-Me₂Ge(3-nBuCp)₂HfMe₂; rac/meso-Ph₂Ge(3-nBuCp)₂HfMe₂; Me₂Si(Me₄Cp)(3-nPrCp)HfMe₂; Ph₂Si(Me₄Cp)(3-nPrCp)HfMe₂; Me₂Ge(Me₄Cp)(3-nPrCp)HfMe₂; Ph₂Ge(Me₄Cp)(3-nPrCp)HfMe₂; PhMeSi(Me₄Cp)(3-nPrCp)HfMe₂; (CH₂)₃Si(Me₄Cp)(3-nPrCp)HfMe₂; (CH₂)₄Si(Me₄Cp)(3-nPrCp)HfMe₂; Et₂Si(Me₄Cp)(3-nPrCp)HfMe₂; Me₂Si(Me₄Cp)(3-nBuCp)HfMe₂; Ph₂Si(Me₄Cp)(3-nBuCp)HfMe₂; Me₂Ge(Me₄Cp)(3-nBuCp)HfMe₂; Ph₂Ge(Me₄Cp)(3-nBuCp)HfMe₂; PhMeSi(Me₄Cp)(3-nBuCp)HfMe₂; (CH₂)₃Si(Me₄Cp)(3-nBuCp)HfMe₂; (CH₂)₄Si(Me₄Cp)(3-nBuCp)HfMe₂; Et₂Si(Me₄Cp)(3-nBuCp)HfMe₂; Me₂Si(3-CH₂-SiMe₃-Cp)₂HfMe₂; Ph₂Si(3-CH₂-SiMe₃-Cp)₂HfMe₂; PhMeSi(3-CH₂-SiMe₃-Cp)₂HfMe₂; SiMe₂(Me₄Cp)(3-nPrCp)HfMe₂; SiPh₂(Me₄Cp)(3-nPrCp)HfMe₂; Me₂Ge(Me₄Cp)(3-nPrCp)HfMe₂; Ph₂Ge(Me₄Cp)(3-nPrCp)HfMe₂; PhMeSi(Me₄Cp)(3-nPrCp)HfMe₂; Et₂Si(Me₄Cp)(3-nPrCp)HfMe₂; SiMe₂(EtMe₃Cp)(3-nPrCp)HfMe₂; SiMe₂(Me₄Cp)(3-nBuCp)HfMe₂; SiPh₂(Me₄Cp)(3-nBuCp)HfMe₂; Me₂Ge(Me₄Cp)(3-nBuCp)HfMe₂; Ph₂Ge(Me₄Cp)(3-nBuCp)HfMe₂; PhMeSi(Me₄Cp)(3-nBuCp)HfMe₂; Et₂Si(Me₄Cp)(3-nBuCp)HfMe₂; SiMe₂(EtMe₃Cp)(3-nBuCp)HfMe₂; SiMe₂(Me₄Cp)(3-CH₂-SiMe₃-Cp)HfMe₂; SiPh₂(Me₄Cp)(3-CH₂-SiMe₃-Cp)HfMe₂; Me₂Ge(Me₄Cp)(3-CH₂-SiMe₃-Cp)HfMe₂; Ph₂Ge(Me₄Cp)(3-CH₂-SiMe₃-Cp)HfMe₂; PhMeSi(Me₄Cp)(3-CH₂-SiMe₃-Cp)HfMe₂; Et₂Si(Me₄Cp)(3-CH₂-SiMe₃-Cp)HfMe₂; SiMe₂(EtMe₃Cp)(3-CH₂-SiMe₃-Cp)HfMe₂; SiMe₂(Me₄Cp)(3-CH₂-SiPhMe₂-Cp)HfMe₂; SiPh₂(Me₄Cp)(3-CH₂-SiPhMe₂-Cp)HfMe₂; Me₂Ge(Me₄Cp)(3-CH₂-SiPhMe₂-Cp)HfMe₂; Ph₂Ge(Me₄Cp)(3-CH₂-SiPhMe₂-Cp)HfMe₂; Et₂Si(Me₄Cp)(3-CH₂-SiPhMe₂-Cp)HfMe₂; SiMe₂(EtMe₃Cp)(3-CH₂-SiPh₃-Cp)HfMe₂; SiMe₂(Me₄Cp)(3-CH₂-SiPh₃-Cp)HfMe₂; SiPh₂(Me₄Cp)(3-CH₂-SiPh₃-Cp)HfMe₂;

Me₂Ge(Me₄Cp)(3-CH₂-SiPh₃)HfMe₂; Ph₂Ge(Me₄Cp)(3-CH₂-SiPh₃)HfMe₂;
PhMeSi(Me₄Cp)(3-CH₂-SiPh₃-Cp)HfMe₂; Et₂Si(Me₄Cp)(3-CH₂-SiPh₃-Cp)HfMe₂;
SiMe₂(EtMe₃Cp)(3-CH₂-SiPh₃-Cp)HfMe₂; SiMe₂(2-Me,3-n-Pr-Ind)₂HfMe₂; SiPh₂(2-Me,3-n-Pr-Ind)₂HfMe₂; GeMe₂(2-Me,3-n-Pr-Ind)₂HfMe₂; GePh₂(2-Me,3-n-Pr-Ind)₂HfMe₂;
5 SiPhMe(2-Me,3-n-Pr-Ind)₂HfMe₂; Et₂Si(2-Me,3-n-Pr-Ind)₂HfMe₂; SiMe₂(2-Me,3-n-Bu-Ind)₂HfMe₂; SiPh₂(2-Me,3-n-Bu-Ind)₂HfMe₂; GeMe₂(2-Me,3-n-Bu-Ind)₂HfMe₂; GePh₂(2-Me,3-n-Bu-Ind)₂HfMe₂; SiPhMe(2-Me,3-n-Bu-Ind)₂HfMe₂; Et₂Si(2-Me,3-n-Bu-Ind)₂HfMe₂;
SiMe₂(2-Me,3-CH₂-SiMe₃-Ind)₂HfMe₂; SiPh₂(2-Me,3-CH₂-SiMe₃-Ind)₂HfMe₂; GeMe₂(2-Me,3-CH₂-SiMe₃-Ind)₂HfMe₂; GePh₂(2-Me,3-CH₂-SiMe₃-Ind)₂HfMe₂; SiPhMe(2-Me,3-CH₂-
10 SiMe₃-Ind)₂HfMe₂; Et₂Si(2-Me,3-CH₂-SiMe₃-Ind)₂HfMe₂; SiMe₂(2-Me,3-CH₂-SiPhMe₂-Ind)₂HfMe₂; SiPh₂(2-Me,3-CH₂-SiPhMe₂-Ind)₂HfMe₂; GeMe₂(2-Me,3-CH₂-SiPhMe₂-Ind)₂HfMe₂;
GePh₂(2-Me,3-CH₂-SiPhMe₂-Ind)₂HfMe₂; SiPhMe(2-Me,3-CH₂-SiPhMe₂-Ind)₂HfMe₂; Et₂Si(2-Me,3-CH₂-SiPhMe₂-Ind)₂HfMe₂; SiMe₂(2-Me,3-CH₂-SiPh₃-Ind)₂HfMe₂;
15 GePh₂(2-Me,3-CH₂-SiPh₃-Ind)₂HfMe₂; SiPhMe(2-Me,3-CH₂-SiPh₃-Ind)₂HfMe₂; Et₂Si(2-Me,3-CH₂-SiPh₃-Ind)₂HfMe₂, and the versions thereof where the Me₂ is replaced with Et₂, Cl₂, Br₂, I₂, or Ph₂.

5. The supported catalyst system according to any of claims 1 to 4, wherein the iron
complex is at least one of: bis(2,6-[1-(2,6-dimethylphenylimino)ethyl])pyridineiron dichloride,
bis(2,6-[1-(2,4,6-trimethylphenylimino)ethyl])pyridineiron dichloride, bis(2,6-[1-(2,6-
dimethylphenylimino)ethyl]-ethyl])pyridineiron dichloride, 2-[1-(2,4,6-
trimethylphenylimino)ethyl]-6-[1-(2,4-dichloro-6-methylphenylimino)ethyl]pyridineiron
dichloride, 2-[1-(2,6-dimethylphenylimino)ethyl]-6-[1-(2-chloro-6-
methylphenylimino)ethyl]pyridineiron dichloride, 2-[1-(2,4,6-trimethylphenylimino)ethyl]-6-
[1-(2-chloro-6-methylphenylimino)ethyl]pyridineiron dichloride, 2-[1-(2,6-
diisopropylphenylimino)ethyl]-6-[1-(2-chloro-6-methylphenylimino)ethyl]pyridineiron
dichloride, 2-[1-(2,6-dimethylphenylimino)ethyl]-6-[1-(2-bromo-4,6-
dimethylphenylimino)ethyl]pyridineiron dichloride, 2-[1-(2,4,6-trimethylphenylimino)ethyl]-
6-[1-(2-bromo-4,6-dimethylphenylimino)ethyl]pyridineiron dichloride, 2-[1-(2,6-
dimethylphenylimino)ethyl]-6-[1-(2-bromo-6-methylphenylimino)ethyl]pyridineiron
dichloride, 2-[1-(2,4,6-trimethylphenylimino)ethyl]-6-[1-(2-bromo-6-
methylphenylimino)ethyl]pyridineiron dichloride, 2-[1-(2,6-diisopropylphenylimino)ethyl]-6-

[1-(2-bromo-6-methylphenylimino)ethyl]pyridineiron dichloride, and the dibromides or tribromides thereof where dichloride in the list above is replaced with dibromide or tribromide.

6. A supported catalyst system according to any of the preceding claims 1 to 5, wherein
5 the support material has a surface area in the range of from 10 m²/g to 700 m²/g and an average particle diameter in the range of from 10 μm to 500 μm.

7. A supported catalyst system according to any of the preceding claims 1 to 6, wherein
10 the support material is selected from the group consisting of silica, alumina, silica-alumina, and combinations thereof.

8. A supported catalyst system according to any of the preceding claims 1 to 7, wherein
the support material is a silica aluminate treated with fluoride or sulfate anions and is activated
with an aluminum alkyl and is substantially void of alumoxane and non-coordinating anion
15 activators.

9. A supported catalyst system of claim 8, wherein the support material has a fluorine
concentration in the range of 0.6 to 3.5 wt%, based upon the weight of the support material.

20 10. A supported catalyst system according to any of the preceding claims 1 to 9, wherein
the activator comprises alumoxane and or a non-coordinating anion.

11. A supported catalyst system according to any of the preceding claims 1 to 10, wherein
the bridged metallocene compound represented by formula A is present in the catalyst system
25 as at least two isomers.

12. A supported catalyst system according to any of the preceding claims 1 to 11, wherein
the activator comprises one or more of: N,N-dimethylanilinium
tetrakis(perfluoronaphthyl)borate, N,N-dimethylanilinium tetrakis(perfluorobiphenyl)borate,
30 N,N-dimethylanilinium tetrakis(perfluorophenyl)borate, N,N-dimethylanilinium tetrakis(3,5-
bis(trifluoromethyl)phenyl)borate, triphenylcarbenium tetrakis(perfluoronaphthyl)borate,
triphenylcarbenium tetrakis(perfluorobiphenyl)borate, triphenylcarbenium tetrakis(3,5-
bis(trifluoromethyl)phenyl)borate, triphenylcarbenium tetrakis(perfluorophenyl)borate,
[Me₃NH⁺][B(C₆F₅)⁴⁻], 1-(4-(tris(pentafluorophenyl)borate)-2,3,5,6-tetrafluorophenyl)

pyrrolidinium; $[\text{Me}_3\text{NH}^+][\text{B}(\text{C}_6\text{F}_5)^4]$, 1-(4-(tris(pentafluorophenyl)borate)-2,3,5,6-tetrafluorophenyl) pyrrolidinium, sodium tetrakis(pentafluorophenyl)borate, potassium tetrakis(pentafluorophenyl)borate, 4-(tris(pentafluorophenyl)borate)-2,3,5,6-tetrafluoropyridinium, solidium tetrakis(perfluorophenyl)aluminate, potassium
5 tetrakis(pentafluorophenyl), and N,N-dimethylanilinium tetrakis(perfluorophenyl)aluminate.

13. A process for polymerization of olefin monomers comprising contacting one or more monomers with a supported catalyst system of any of claims 1 to 12.
- 10 14. A process to produce linear low density polyethylene comprising contacting one or more monomers with a supported catalyst system of any of claims 1 to 12.
- 15 15. A process for the production of an ethylene alpha-olefin copolymer comprising: polymerizing ethylene and at least one $\text{C}_3\text{-C}_{20}$ alpha-olefin by contacting the ethylene and the
15 at least one $\text{C}_3\text{-C}_{20}$ alpha-olefin with a supported catalyst of any of claims 1-12 in at least one gas phase reactor at a reactor pressure of from 0.7 to 70 bar and a reactor temperature of from 20°C to 150°C to form an ethylene alpha-olefin copolymer.
- 20 16. An ethylene alpha-olefin copolymer obtained by contacting ethylene, at least one $\text{C}_3\text{-C}_{20}$ alpha-olefin, and a supported catalyst of any of claims 1-12 in at least one gas-phase reactor, the copolymer having a density of 0.890 g/cc or more, a melt flow index from 0.1 to 80 g/10 min, and a molecular weight distribution from 1.5 to 15.0.
- 25 17. The copolymer of claim 16, wherein the copolymer has a density from 0.900 to 0.940 g/cc.
18. The copolymer of any of claims 16 or 17 wherein the copolymer has an M_w value of 50,000 to 400,000 g/mol and an M_w/M_n value of 2.3 to 15.
- 30 19. A process for the production of an ethylene alpha-olefin copolymer comprising: polymerizing ethylene and at least one $\text{C}_3\text{-C}_{20}$ alpha-olefin by contacting the ethylene and the at least one $\text{C}_3\text{-C}_{20}$ alpha-olefin with a supported catalyst of any of claims 1-12 in at least one slurry phase reactor at a reactor pressure of from 0.7 to 70 bar and a reactor temperature of from 20°C to 150°C to form an ethylene alpha-olefin copolymer.

20. An ethylene alpha-olefin copolymer obtained by contacting ethylene, at least one C₃-C₂₀ alpha-olefin, and a supported catalyst of any of claims 1-12 in at least one slurry phase reactor, the copolymer having a density of 0.890 g/cc or more, a melt flow index from 0.1 to 80 g/10 min, and a molecular weight distribution from 2.3 to 15.0.
21. An ethylene alpha-olefin copolymer obtained by contacting ethylene, at least one C₃-C₂₀ alpha-olefin, and a supported catalyst of any of claims 1-12 in at least one gas phase reactor, the copolymer having a density of 0.890 g/cc or more, a melt flow index from 0.1 g/10 min to 80 g/10 min, and a RCI,m between 50 and 100 and a CDR-2 m between 0.5 and 2.
22. An ethylene alpha-olefin copolymer obtained by contacting ethylene, at least one C₃-C₂₀ alpha-olefin, and a supported catalyst of any of claims 1-12 in at least one gas phase reactor, the copolymer having a density of 0.890 g/cc or more, a melt flow index from 0.1 g/10 min to 80 g/10 min, and a RCI,m between 50 and 100 and a CDR-2 m between 0.5 and 2.
23. An ethylene alpha-olefin copolymer comprising ethylene and from 0.5 to 25 mol% of one or more C₃ to C₂₀ olefin comonomers and having: a density of 0.91 g/cc or greater; a T₇₅-T₂₅ greater than 20°C; a vinyl content of greater than 50% of the total unsaturation; a total internal plus terminal unsaturation greater than 0.7 unsaturations per 1000 carbon atoms; a terminal unsaturation: internal saturation ratio of from 1 to 4; and a g'vis greater than 0.9.
24. The ethylene alpha-olefin copolymer of claim 23 wherein the RCI,m is greater than 50.