CLAIMS

1. A metal complex of the formula (1):

$$TCyLMZ_p \quad (1),$$

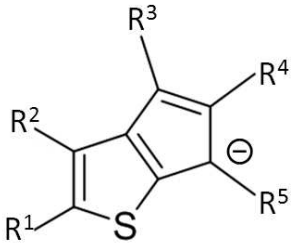
wherein

M is titanium,

Z is an anionic ligand selected from C_1-C_4-alkyl,

p is the number 2,

TCy is a thiophene fused cyclopentadienyl-type ligand of the formula (2):



(2)

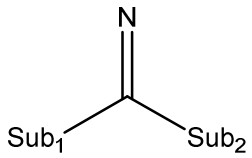
wherein

R^1 and R^2 are individually selected from the group of hydrogen, halogen, C_1-C_{10} alkyl, C_5- C_{10} cycloalkyl, an unsubstituted or C_1-C_{10}-alkyl or C_1-C_4-dialkyl amino substituted C_6-C_{10} aryl, in particular C_1-C_4-alkyl substituted phenyl, and SiR_3, OR, NR_2, SR, PR_2, wherein R means individually C_1-C_{10}-alkyl, C_5-C_{10}-cycloalkyl and an unsubstituted or C_1-C_{10}-alkyl or C_1-C_4-dialkyl amino substituted C_6-C_{10}-aryl, in particular C_1-C_4-alkyl substituted phenyl or,

R^1 and R^2, together with the 2 double bond carbon atoms of the thiophene ring they are connected to, form an unsubstituted or C_1-C_4-alkyl substituted aliphatic C_5-C_6-cycloalkene ring,

R^3, R^4 and R^5 are individually selected from the group of hydrogen, C_1-C_4 alkyl, unsubstituted or C_1-C_4-alkyl and/or halogen, in particular chlorine or fluorine substituted C_6-C_{10}-aryl, in particular C_1-C_4-alkyl substituted phenyl, and SiR_3, OR, NR_2, SR, PR_2, wherein R means individually C_1-C_{10}-alkyl, C_5-C_{10}-cycloalkyl, and an unsubstituted or C_1-C_{10}-alkyl or C_1-C_4-dialkyl amino substituted C_6-C_{10}-aryl, in particular C_1-C_4-alkyl substituted phenyl and,

L is an amidinate ligand of the formula (3):



(3)

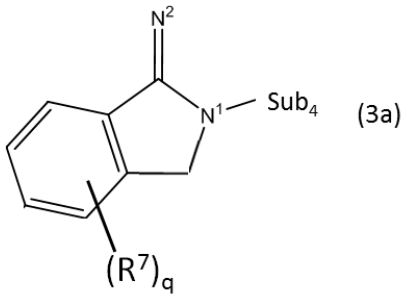
wherein the amidine-containing ligand is covalently bonded to the metal M via the imine nitrogen atom, and

Sub_1 is an unsubstituted or C_1-C_4-alkyl and/or halogen, in particular chlorine or fluorine substituted C_6-C_{10}-aromatic substituent, in particular phenyl and

Sub_2 is an amino radical of the formula $–NR^8R^9$ with R^8 and R^9 being individually selected from the group of aliphatic hydrocarbyl, halogenated aliphatic hydrocarbyl, aromatic hydrocarbyl, halogenated aromatic hydrocarbonyl residues whereby R^8 optionally forms a heterocyclic structure with R^9 or Sub_1,

or

Sub_1 and Sub_2, together with the imino group they are connected to, form a ligand of formula (3a):



(3a)

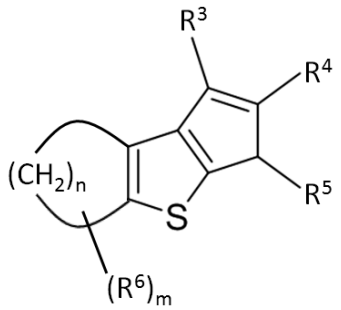
wherein the amidine-containing ligand (3a) is covalently bonded to the metal M via the imine nitrogen atom N^2,

wherein the benzo ring fused to the amidine ring may be unsubstituted or may contain further substituents R^7, which are individually of the index "q" selected from the group of hydrogen, C_1-C_4-alkyl and halogen and whereby q is a number of 0 to 4, preferably 0 to 2, most preferably 0, and

Sub_4 is a C_6-C_{10} aromatic ring, preferably phenyl, which is unsubstituted or substituted by one or more substituents from the group selected from halogen, in particular Cl or F and C_1-C_4-alkyl.

2. The metal complex according to claim 1, wherein Sub_1 is an unsubstituted phenyl residue or a C_1-C_4-alkyl and/or Cl substituted phenyl residue.

3. The metal complex according to any one of claims 1 or 2, wherein TCy is a thiophene fused cyclopentadienyl ligand of formula (2a):



(2a)

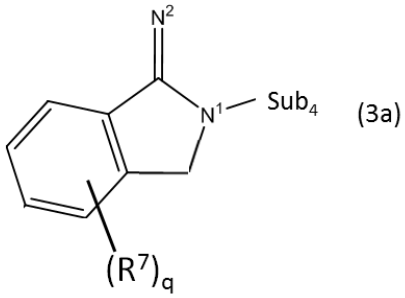
wherein

n is the number 3 or 4 and

R^6 means individually a C_1-C_4-alkyl for each index m,

m is a number of 0 to 4, preferably 0 to 2.

4. The metal complex according to any one of claims 1 to 3, wherein the ligand L corresponds to the formula 3a):



(3a)

wherein the amidine-containing ligand (3a) is covalently bonded to the metal M via the imine nitrogen atom N^2,

wherein the benzo ring fused to the amidine ring may be unsubstituted or may contain further substituents R^7, which are individually of the index "q" selected from the group of hydrogen, C_1-C_4-alkyl and halogen and whereby q is a number of 0 to 4, preferably 0 to 2, most preferably 0.

5. A process for manufacturing a metal complex according to claims 1 to 4, wherein a metal complex of the formula (3)

$$TCyMZ_{p+1} \qquad (3)$$

is reacted with an amidine of the formula LH or its hydrohalogen acid salt LH·HZ, wherein L has the meaning as defined in claim 1 or claim 4 and Z

means halogen, in particular Cl, Br, or F.

6. A catalyst system comprising
   a) a metal complex according to claims 1 to 4,
   b) an activator and
   c) optionally a scavenger.

7. The catalyst system according to claim 6 wherein the scavenger c) is hydrocarbyl of a metal or metalloid of group 1-13 or its reaction products with at least one sterically hindered compound containing a group 15 or 16 atom.

8. The catalyst system according to claim 6 or 7 wherein the activator b) is a borane, a borate or an organoaluminum compound (E), preferably an alkylaluminoxane.

9. A process for the preparation of a polymer by polymerizing at least one olefinic monomer comprising contacting said monomer with a metal complex according to claims 1 to 4 or a catalyst system according to claim 6 to 8.

10. The process according to claim 9 wherein ethylene and at least a C_{3}-C_{12}-α-olefin are used as olefinic monomers.

11. The process according to claim 9 or 10 wherein ethylene, at least one C_{3-12} alpha olefin and at least one non-conjugated diene, preferably selected from the group consisting of 5-methylene-2-norbornene 5-ethylidene-2-norbornene, 5-vinylnorbornene, 2,5-norbornadiene, dicyclo-pentadiene and vinylcyclohexene, are used as olefinic monomers.

12. The process according to claim 9 or 10 wherein the at least one non-conjugated diene is selected from the group consisting of 5-ethylidene-2-norbornene and 5-vinylnorbornene.