



(11) **EP 2 174 964 A8**

(12) **CORRECTED EUROPEAN PATENT APPLICATION**

(15) Correction information:
Corrected version no 1 (W1 A2)
Corrections, see
Bibliography INID code(s) 84

(51) Int Cl.:
C08F 210/00 ^(2006.01) **C08F 4/642** ^(2006.01)
C07F 17/00 ^(2006.01)

(48) Corrigendum issued on:
30.06.2010 Bulletin 2010/26

(43) Date of publication:
14.04.2010 Bulletin 2010/15

(21) Application number: **09016142.3**

(22) Date of filing: **08.09.1999**

(84) Designated Contracting States:
CH DE FR GB IT LI SE

(30) Priority: **13.10.1998 KR 19980042729**

(62) Document number(s) of the earlier application(s) in accordance with Art. 76 EPC:
02028086.3 / 1 302 483
99117715.5 / 0 994 132

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Remarks:
This application was filed on 30-12-2009 as a divisional application to the application mentioned under INID code 62.

(54) **Metallocene catalysts for olefin polymerization and method of polymerizing olefins using the metallocene catalysts**

(57) The new metallocene catalysts according to the present invention are prepared by reacting a metallocene compound with a compound having at least two functional groups. The metallocene compound is a transition metal compound, which is coordinated with a main ligand such as cyclopentadienyl group, and an ancillary ligand. The functional groups in the compound are selected from the group consisting of a hydroxyl group, an alkyl or aryl magnesium halide, a thiol group, a primary amine group, a secondary amine group, a primary phosphorous group, a secondary phosphorous group, etc. The metallocene catalysts according to the present invention have a struc-

ture in which an ancillary ligand of a metallocene compound is bonded to the functional groups of a compound having at least two functional groups. A structure of the metallocene catalysts can be varied with the type of a metallocene compound and a compound having at least two functional groups, and the molar ratio of each reactant. The metallocene catalysts are employed with a co-catalyst for olefin polymerization. The co-catalyst is an organometallic compound, or a mixture of non-coordinated Lewis acid and alkyl aluminium as it is well known in the art.

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