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| <b>(51) International Patent Classification <sup>6</sup>:</b><br><b>C07F 17/00</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>A1</b> | <b>(11) International Publication Number:</b> <b>WO 97/25336</b><br><b>(43) International Publication Date:</b> 17 July 1997 (17.07.97)                                                                                                                                   |
| <b>(21) International Application Number:</b> PCT/US96/19281<br><b>(22) International Filing Date:</b> 5 December 1996 (05.12.96)<br><b>(30) Priority Data:</b><br>60/009,684                      3 January 1996 (03.01.96)                      US<br><b>(71) Applicant:</b> THE DOW CHEMICAL COMPANY [US/US];<br>2030 Dow Center, Midland, MI 48674 (US).<br><b>(72) Inventors:</b> TIMMERS, Francis, J.; 4605 Lund Drive, Midland,<br>MI 48642 (US). DEVORE, David, D.; 4881 East Shaffer<br>Road, Midland, MI 48642 (US). NEITHAMER, David, R.;<br>6007 Sturgeon Creek Parkway, Midland, MI 48640 (US).<br><b>(74) Agent:</b> DELINE, Douglas, N.; The Dow Chemical Company,<br>Patent Dept., P.O. Box 1967, Midland, MI 48641-1967<br>(US).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |           | <b>(81) Designated States:</b> AU, BR, CA, CN, CZ, HU, IL, JP, KR,<br>MX, NO, PL, PT, RU, SG, SK, TR, UA, European patent<br>(AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU,<br>MC, NL, PT, SE).<br><br><b>Published</b><br><i>With international search report.</i> |
| <b>(54) Title:</b> PREPARATION OF BISCYCLOPENTADIENYL DIENE COMPLEXES<br><br><b>(57) Abstract</b><br><br><p>Bicyclopentadienyl Group 4 transition metal complexes containing a conjugated diene ligand group wherein the diene is bound to the transition metal either in the form of a <math>\sigma</math>-complex or a <math>\pi</math>-complex are readily prepared by reacting in any order: a) a Group 4 metal salt corresponding to the formula <math>M^*X_3</math> or <math>M^{**}X_4</math>, or a Lewis base adduct thereof, b) a conjugated diene, <math>D'</math>, c) a reducing agent, and d) a compound of the formula: <math>CpM^*</math> or <math>(Cp-Cp)M^{**}_n</math>, wherein <math>M^*</math> is titanium, zirconium or hafnium in the +3 formal oxidation state; <math>M^{**}</math> is titanium, zirconium or hafnium in the +4 formal oxidation state; <math>X</math> is a halide, <math>C_{1-6}</math> hydrocarbyloxy or <math>di(C_{1-6}</math> hydrocarbyl)amido group; <math>D'</math> is an uncoordinated diene having the same number of carbons as <math>D</math> and the same substitution pattern as <math>D</math>; <math>M^*</math> is a Group 1 or 2 metal cation, a Grignard reagent cation or a <math>tri(C_{1-4}</math> hydrocarbyl)silyl group; and <math>n</math> is 1 when <math>M^*</math> is a Group 2 metal cation and <math>n</math> is 2 when <math>M^*</math> is a Group 1 metal cation, a Grignard reagent cation, or a trihydrocarbylsilyl group with the proviso that reagents a) and d) are not contacted with one another in the absence of reagent c).</p> |           |                                                                                                                                                                                                                                                                           |