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(54) **Title:** Z-SELECTIVE OLEFIN METATHESIS CATALYSTS AND THEIR SYNTHETIC PROCEDURE

(57) **Abstract:** The invention relates to C-H activated olefin metathesis catalyst compounds, the preparation of such compounds, and the use of such catalysts in the metathesis of olefins and olefin compounds, more particularly, the use of such catalysts in Z selective olefin metathesis reactions. In general, the catalyst compounds of the invention comprise a Group 8 metal (M), an alkylidene moiety ($=CR^1R^2$), or more generally ($=C)_mC R^1R^2$), an anionic ligand (X^1), two or three neutral ligands (L^1 , L^2 , and L^3) and a 2-electron anionic donor bridging moiety (Q^*) that forms a chelate ring structure in conjunction with L^1 and M. Such catalysts generally correspond to the formula $X^1(L^3)_kL^2L^1Q^*M=(C)_mCR^1R^2$, wherein X^1 is any anionic ligand, L^1 , L^2 , and L^3 are, independently, any neutral electron donor ligand, k is 0 or 1, m is 0, 1, or 2, Q^* is a 2-electron anionic donor bridging moiety linking L^1 and M, M is a Group 8 transition metal, and R^1 and R^2 are, independently, hydrogen, hydrocarbyl, substituted hydrocarbyl, heteroatom-containing hydrocarbyl, substituted heteroatom-containing hydrocarbyl, or functional groups. The invention has utility in the fields of catalysis, organic synthesis, polymer chemistry, and industrial and fine chemicals chemistry.

