What is claimed is:

1. A method of making a metal-ligand complex, the method comprising:

reacting a $(L^1)H$ compound and a base in a primary solvent to make a reaction mixture comprising an intermediate anionic L^1 compound in the primary solvent; and

reacting the intermediate anionic L^1 compound and a L^2MX_3 complex to make a $L^1L^2MX_2$ complex, wherein L^1 and L^2 independently are cyclopentadienyl-type (Cp-type) ligands, M is zirconium or hafnium, and each X is a halide and wherein the intermediate anionic L^1 compound is not isolated from the reaction mixture.

2. The method of claim 1, comprising reacting the $L^1L^2MX_2$ complex with an alkylating agent to make a $L^1L^2MR_2$ complex, wherein the $L^1L^2MX_2$ complex is not isolated from the reaction mixture, wherein each R is a hydrocarbyl substituent.

3. The method of any one of claims 1-2, wherein the primary solvent is selected from ethers, polyethers, thioethers, and hydrocarbons.

4. The method of any one of claims 1-2, wherein the primary solvent is selected from dimethoxyethane, toluene, ether, tetrahydrofuran, and combinations of any two or more thereof.

5. The method of any one of claims 1-2, wherein each X is Cl.

6. The method of claim 2, wherein the alkylating agent is an alkylmagnesium halide.

7. The method of any one of claims 1-2, wherein the base is selected from butyllithium, 1-methylpropyllithium, 2-methylpropyllithium, and 1,1-dimethylethyllithium.

8. The method of any one of claims 1-2, wherein each of L^1 and L^2 is independently a substituted cyclopentadienyl or a substituted indenyl.

9. The method of any one of claims 1-2, wherein L^1 and L^2 are different.

10. The method of any of claim 1-2, wherein the $L^1L^2MX_2$ complex is (methylcyclopentadienyl)(1,5-dimethylindenyl)hafnium dichloride.

11. The method of claim 2, wherein each R is independently a C_1 to C_{20} alkyl or benzyl.

12. The method of claim 2, wherein the the $L^1L^2MR_2$ complex is (methylcyclopentadienyl)(1,5-dimethylindenyl)hafnium dimethyl.

13. The method of claim 2, wherein the reacting the $(L^1)H$ compound and the base to make the intermediate anionic L^1 compound, and the reacting the intermediate anionic L^1 compound and the L^2MX_3 complex to make the $L^1L^2MX_2$ complex occurs in a same reaction vessel without removing the intermediate anionic L^1 compound from the reaction vessel.

14. The method of claim 13, wherein the reacting the $(L^1)H$ compound and the base to make the intermediate anionic L^1 compound and the reacting the intermediate anionic L^1 compound and the L^2MX_3 complex to make the $L^1L^2MX_2$ complex, and the reacting the $L^1L^2MX_2$ complex and the alkylating agent to make the $L^1L^2MR_2$ complex occurs in the same reaction vessel without removing the intermediate anionic L^1 compound and the $L^1L^2MX_2$ complex from the reaction vessel.

15. The method of claim 14, wherein the reacting the $(L^1)H$ compound and the base, the reacting the intermediate anionic L^1 compound and the L^2MX_3 complex, and the reacting the $L^1L^2MX_2$ complex with the alkylating agent occurs in the primary solvent.