CLAIMS

What is claimed is:

1. A method of preparing a polymer, the method comprising:
   i. metalating an organophosphine compound in the substantial absence of monomer and in the presence of an oxygen-containing polar coordinator to form a metalated organophosphine; and
   ii. introducing the metalated organophosphine to monomer including conjugated diene monomer to form a reactive polymer.

2. The method of claim 1, where said step of metalating an organophosphine compound includes reacting a secondary organophosphine with an organolithium compound.

3. The method of claim 2, where the secondary organophosphine is a dihydrocarbyl phosphine or substituted dihydrocarbyl phosphine.

4. The method of claim 1, where said step of metalating an organophosphine includes reacting a group I or group II metal with an halodiorganophosphine.

5. The method of claim 4, wherein the group I or group II metal is lithium.

6. The method of claim 5, where the halodiorganophosphine is a dihydrocarbyl phosphinous halide or substituted dihydrocarbyl phosphinous halide.

7. The method of claim 1, where the metalated organophosphine is lithium organophosphide.

8. The method of claim 1, further comprising the step of reacting the reactive polymer with a proton source, a coupling agent, or a functionalizing agent.

9. The method of claim 1, where the monomer also includes vinyl aromatic monomer.

~~10. The method of claim 2, where said step of reacting takes place in the presence of a polar coordinator.~~

~~11.~~10. The method of claim 1, where said step of ~~reacting~~metalating takes place within an aliphatic and/or cycloaliphatic solvent.

~~12.~~11. The method of claim 2, where the molar ratio of organolithium to the secondary organophosphine is from about 10:1 to about 0.05:1.

~~13.~~12. The method of claim 5, where the molar ratio of lithium metal to the halodiorganophosphine is from about 10:1 to about 1:1.

~~14.~~13. The method of claim 1, where said step of metalating takes place in the presence of less than 1 mole percent monomer to phosphine.

~~15.~~14. The methods of claim 1, where said step of introducing takes place continuously under continuous polymerization techniques.

15. The method of claim 1, where the polar coordinator is an ether.

16. The method of claim 15, where the polar coordinator is a linear oligomeric oxolanyl alkane.

17. The method of claim 15, where the polar coordinator is a cyclic oligomeric oxolanyl alkane.

18. The method of claim 1, where the polar coordinator is selected from the group consisting of 2,2-bis(2'-tetrahydrofuryl)propane, tetrahydrofuran (THF), dimethyl ether, and diethyl ether.

19. The method of claim 1, where the polar coordinator is 2,2-bis(2'-tetrahydrofuryl)propane.

20. The method of claim 1, where the amount of oxygen-containing polar coordinator present during said step of metalating is from about 10,000 to about 0.001 moles per mole of phosphine.

21. The method of claim 20, where the amount of oxygen-containing polar coordinator present during said step of metalating is from about 100 to about 0.05 moles per mole of phosphine.

22. The method of claim 20, where the amount of oxygen-containing polar coordinator present during said step of metalating is from about 50 to about 0.1 moles per mole of phosphine.

23. The method of claim 2, where said step of metalating takes place within a reaction mixture that consists essentially of the secondary organophosphine, the organolithium compound, the polar coordinator, and optionally a solvent.

24. The method of claim 22, where said step of metalating takes place within a reaction mixture that consists of the secondary organophosphine, the organolithium compound, the polar coordinator, and optionally a solvent.

~~16.~~25. A method of preparing a polymer, the method comprising:

i. preparing an initiator having the formula R_2PLi, where each R is independently a monovalent organic group, P is a phosphorus atom, and Li is a lithium atom attached directly to the phosphorus atom, where said step of preparing takes place in the substantial absence of monomer and in the presence of an oxygen-containing polar coordinator; and

ii. polymerizing conjugated diene monomer by initiating the polymerization with the initiator.

~~17. The method of claim 16, where said step of preparing an initiator takes place in the substantial absence of monomer.~~

~~18.~~26. The method of claim ~~16~~25, where said step of polymerizing takes place continuously.

~~19. A polymer composition wherein the composition includes at least 30 percent by weight polymer defined by the formula:~~

~~$(R_2P-\pi)_n-\omega$~~

~~where each R is independently a monovalent organic group, P is a phosphorus atom, π is a polymer chain, ω is a hydrogen atom, a terminal functional group, or a multivalent coupling group, and where n is an integer from 1 to about 4.~~

~~20. The method of claim 19, where π is a polydiene or polydiene copolymer having a cis content of from about 10% to 60% and a vinyl content of from about 10% to 90%.~~

27. The method of claim 25, where the polar coordinator is selected from the group consisting of 2,2-bis(2'-tetrahydrofuryl)propane, tetrahydrofuran (THF), dimethyl ether, and diethyl ether.

28. The method of claim 25, where the polar coordinator is 2,2-bis(2'-tetrahydrofuryl)propane.

29. The method of claim 25, where the amount of oxygen-containing polar coordinator present during said step of metalating is from about 100 to about 0.05 moles per mole of phosphine.