CLAIMS

What is claimed is:

1. A method of polymerizing a radical polymerizable compound using an organoborane initiator, said method comprising the steps of:

A introducing the radical polymerizable compound and the organoborane initiator onto a substrate to form a mixture wherein the organoborane initiator is complexed with a bi-functional noncyclic blocking agent having a carbon backbone and two organoborane complexing moieties different from each other and selected from the group of an amine moiety, a thiol moiety, and a phosphine moiety and wherein the two differing moieties are separated from each other by two to four carbon atoms to increase nucleophilicity of the blocking agent towards the organoborane initiator;

B. decomplexing the organoborane initiator from the blocking agent thereby forming a radical; and

C. polymerizing the radical polymerizable compound using the radical, optionally in the absence of external heating, or optionally at a temperature of from 20°C to 30°C.

2. A method as set forth in claim 1 wherein the substrate is further defined as an automobile component, the mixture is further defined as a coating composition, the step of polymerizing cures the coating composition on the automobile component and the method optionally further comprises the step of electrocoating the automobile component with a first composition wherein the coating composition is applied to the first composition on the automobile component.

3. A method as set forth in claim 1 or claim 2 wherein the two differing moieties are separated from each other by two carbon atoms.

4. A method as set forth in any one of claims 1 to 3 wherein the blocking agent is aliphatic and has a single terminal amine moiety and a single terminal thiol moiety.

5. A method as set forth in any one of claims 1 to 4 wherein the blocking agent is free of carbon-carbon unsaturation and optionally wherein the blocking agent is 2-aminoethanethiol and the organoborane is optionally complexed with the amine moiety or the thiol moiety of the 2-aminoethanethiol.

6. A method as set forth in any one of claims 1 to 5 wherein the step of decomplexing the organoborane initiator from the blocking agent is further defined as introducing a decomplexing agent to the mixture that is reactive with at least one of the amine moiety, the thiol moiety, and the phosphine moiety to decomplex the organoborane initiator from the blocking agent and wherein the decomplexing agent is carbon dioxide or is optionally selected from the group of carbon dioxide, sulfur dioxide, and combinations thereof.

7. A method as set forth in claim 6 wherein the step of introducing the radical polymerizable compound and the organoborane initiator onto the substrate to form the mixture and the step of introducing the decomplexing agent occur simultaneously or occur sequentially.

8. A method as set forth in any one of claims 6 or 7 wherein the steps of introducing the radical polymerizable compound and the organoborane initiator onto the substrate and the step of introducing the decomplexing agent are each further defined as spraying from one or more spray guns.

9. A method as set forth in any one of claims 1 to 8 wherein the radical polymerizable compound and the organoborane initiator are introduced simultaneously or sequentially.

10. A method as set forth in any one of claims 1 to 9 wherein the radical polymerizable compound is selected from the group of unsaturated acrylic ester resins, functional acrylic ester monomers, methacrylates, and combinations thereof.

11. A radical polymerizable automotive coating composition comprising:

A. a radical polymerizable compound; and

B. an organoborane initiator complexed with a bi-functional noncyclic blocking agent having a carbon backbone and two organoborane complexing moieties different from each other and selected from said group of an amine moicty, a thiol moicty, and a phosphinc moiety and wherein said two differing moieties are separated from each other by two to four carbon atoms to increase nucleophilicity of said blocking agent towards said organoborane initiator.

12. A coating composition as set forth in claim 11 wherein said two differing moieties are separated from each other by two carbon atoms.

13. A coating composition as set forth in claim 11 or claim 12 wherein said blocking agent is aliphatic and has a single terminal amine moiety and a single terminal thiol moiety.

14. A coating composition as set forth in any one of claims 11 to 13 wherein said blocking agent is free of carbon-carbon unsaturation and optionally wherein said blocking agent is 2-aminocthanethiol and said organoboranc is optionally complexed with said amine moicty or said thiol moiety of said 2-aminoethanethiol.

15. A coating composition as set forth in any one of claims 11 to 14 further comprising a decomplexing agent that is carbon dioxide or optionally selected from said group of carbon dioxide, sulfur dioxide, and combinations thereof.

What is claimed is:

1. A method of polymerizing a radical polymerizable compound using an organoborane initiator, said method comprising the steps of:

A. introducing the radical polymerizable compound and the organoborane initiator onto a substrate to form a mixture wherein the organoborane initiator is complexed with a bi-functional noncyclic blocking agent having a carbon backbone and two organoborane complexing moieties different from each other and selected from the group of an amine moiety, a thiol moiety, and a phosphine moiety and wherein the two differing moieties are separated from each other by two to four carbon atoms to increase nucleophilicity of the blocking agent towards the organoborane initiator thereby allowing the blocking agent to more completely interact with the organoborane initiator;

B. decomplexing the organoborane initiator from the blocking agent thereby forming a radical; and

C. polymerizing the radical polymerizable compound using the radical, at a temperature of from 20° C. to 30° C.

2. The method as set forth in claim **1**, wherein

the substrate is an automobile component,

the mixture is a coating composition,

the step of polymerizing cures the coating composition on the automobile component and the method optionally further comprises the step of electrocoating the automobile component with a first composition wherein the coating composition is applied to the first composition on the automobile component.

3. The method as set forth in claim **1**, wherein the two differing moieties are separated from each other by two carbon atoms.

4. The method as set forth in claim **1**, wherein the blocking agent is aliphatic and has a single terminal amine moiety and a single terminal thiol moiety.

5. The method as set forth in claim **1**, wherein the blocking agent is free of carbon-carbon unsaturation and wherein the blocking agent is 2-aminoethanethiol.

6. The method as set forth in claim **1**, wherein the step of decomplexing the organoborane initiator from the blocking agent is by introducing a decomplexing agent to the mixture that is reactive with at least one of the amine moiety, the thiol moiety, and the phosphine moiety to decomplex the organoborane initiator from the blocking agent and wherein the decomplexing agent is selected from the group of carbon dioxide, sulfur dioxide, and combinations thereof.

7. The method as set forth in claim **6**, wherein the decomplexing agent is carbon dioxide.

8. The method as set forth in claim **6**, wherein the step of introducing the radical polymerizable compound and the organoborane initiator onto the substrate to form the mixture and the step of introducing the decomplexing agent occur simultaneously.

9. The method as set forth in claim **6**, wherein the step of introducing the radical polymerizable compound and the organoborane initiator onto the substrate to form the mixture and the step of introducing the decomplexing agent occur sequentially.

10. The method as set forth in claim **6**, wherein the steps of introducing the radical polymerizable compound and the organoborane initiator onto the substrate and the step of introducing the decomplexing agent are each further defined as spraying from one or more spray guns.

11. The method as set forth in claim **1**, wherein the radical polymerizable compound and the organoborane initiator are introduced simultaneously.

12. The method as set forth in claim **1**, wherein the radical polymerizable compound and the organoborane initiator are introduced sequentially.

13. The method as set forth in claim **1**, wherein the radical polymerizable compound is selected from the group consisting of unsaturated acrylic ester resins, acrylic ester monomers, methacrylates, and combinations thereof.

14. The method as set forth in claim **1**, wherein the blocking agent is free of carbon-carbon unsaturation and wherein

the blocking agent is 2-aminoethanethiol and the organoborane is complexed with the amine moiety or the thiol moiety of the 2-aminoethanethiol.

15. The method as set forth in claim **1**, wherein the polymerizing is in the absence of external heating.

16. A radical polymerizable automotive coating composition comprising:

A. a radical polymerizable compound; and

B. an organoborane initiator complexed with a bi-functional noncyclic blocking agent having a carbon backbone and two organoborane complexing moieties different from each other and selected from said group of an amine moiety, a thiol moiety, and a phosphine moiety and wherein said two differing moieties are separated from each other by two to four carbon atoms to increase nucleophilicity of said blocking agent towards said organoborane initiator thereby allowing the blocking agent to more completely interact with the organoborane initiator.

17. The coating composition as set forth in claim **16**, wherein said two differing moieties are separated from each other by two carbon atoms.

18. The coating composition as set forth in claim **16**, wherein said blocking agent is aliphatic and has a single terminal amine moiety and a single terminal thiol moiety.

19. The coating composition as set forth in claim **16**, wherein said blocking agent is free of carbon-carbon unsaturation and wherein said blocking agent is 2-aminoethanethiol.

20. The coating composition as set forth in claim **16**, further comprising a decomplexing agent that is selected from said group of carbon dioxide, sulfur dioxide, and combinations thereof.

21. The coating composition as set forth in claim **20**, further comprising a decomplexing agent that is carbon dioxide.

22. The coating composition as set forth in claim **16**, wherein the blocking agent is free of carbon-carbon unsaturation and wherein the blocking agent is 2-aminoethanethiol and the organoborane is complexed with the amine moiety or the thiol moiety of the 2-aminoethanethiol.