CLAIMS

What is claimed is:

1. An encapsulated particle comprising:

a core particle; and

a polyurethane layer disposed about said core particle and comprising the reaction product of

an isocyanate component, and

an isocyanate-reactive component comprising a graft polyol having a continuous phase and polymeric particles, wherein said graft polyol is selected from the group of polymer polyols, polyharnstoff (PHD) polyols, polyisocyanate polyaddition (PIPA) polyols, and combinations thereof

wherein the polymeric particles comprise the reaction product of monomers selected from the group of styrenes, acrylonitriles, esters of acrylic and methacrylic acids, ethylenically unsaturated nitriles, amines, amides, and combinations thereof.

2. An encapsulated particle as set forth in claim 1, wherein said graft polyol is a polymer polyol.

3. An encapsulated particle as set forth in any one of claims 1or 2, wherein said isocyanate component is selected from the group of polymeric diphenylmethane diisocyanates (PMDI), diphenylmethane diisocyanates (MDI), and combinations thereof.

4. An encapsulated particle as set forth in any one of claims 1-3, wherein said core particle comprises a fertilizer.

5. An encapsulated particle as set forth in claim 1, wherein

said core particle comprises a fertilizer.

said isocyanate component is selected from the group of polymeric diphenylmethane diisocyanates (PMDI), diphenylmethane diisocyanates (MDI), and combinations thereof, and

said isocyanate-reactive component comprises a polymer polyol having a continuous phase and polymeric particles, the continuous phase comprising a polyol having at least two hydroxyl functional (OH) groups.

6. An encapsulated particle as set forth in any one of claims 1-5, wherein said polymeric particles comprise styrene acrylonitrile (SAN) copolymers.

7. An encapsulated particle as set forth in any one of claims 1-6, wherein said polymeric particles are present in said isocyanate-reactive component in an amount of from about 5 to about 70 parts by weight based on 100 parts by weight of said isocyanate-reactive component.

8. An encapsulated particle as set forth in any one of claims 1-4 or 6-7, wherein said continuous phase comprises a hydrophobic polyol having at least two hydroxyl functional (OH) groups.

9. An encapsulated particle as set forth in any one of claims 1-8, wherein said continuous phase comprises castor oil.

10. An encapsulated particle as set forth in any one of claims 1-9, wherein said polyurethane layer has an average thickness of from about 50 to about 200 microns.

11. An encapsulated particle as set forth in any one of claims 1-10, wherein I) said polyurethane layer includes a concentration of said isocyanate-reactive component proximal to said core particle and a concentration of said isocyanate component distal to said core particle and adjacent to said concentration of said isocyanate-reactive component, or wherein II) said polyurethane layer includes a concentration of said isocyanate component proximal to said core particle and a concentration of said isocyanate-reactive component distal to said core particle and adjacent to said concentration of said isocyanate component.

12. A method of forming an encapsulated particle, said method comprising the steps of:

providing a core particle;

applying an isocyanate component and an isocyanate-reactive component comprising a graft polyol having a continuous phase and polymeric particles to the core particle; and

reacting the isocyanate component and the isocyanate-reactive component to form a polyurethane layer disposed about the core particle to form the encapsulated particle, wherein said graft polyol is selected from the group of polymer polyols, polyharnstoff (PHD) polyols, polyisocyanate polyaddition (PIPA) polyols, and combinations thereof,

wherein the polymer polyols as polymeric particles comprise the reaction product of monomers selected from the group of styrenes, acrylonitriles, esters of acrylic and methacrylic acids, ethylenically unsaturated nitriles, amines, amides, and combinations thereof.

13. A method as set forth in claim 12, wherein I) the isocyanate-reactive component is applied to the core particle prior to applying the isocyanate component to the core particle, or wherein II) the isocyanate component is applied to the core particle prior to applying the isocyanate-reactive component to the core particle.

14. A method as set forth in claim 12 or 13, wherein

the core particle comprises a fertilizer,

the isocyanate component is selected from the group of polymeric diphenylmethane diisocyanates (PMDI), diphenylmethane diisocyanates (MDI), and combinations thereof, and

the isocyanate-reactive component comprises a polymer polyol having a continuous phase and polymeric particles, the continuous phase comprising a polyol having at least two hydroxyl functional (OH) groups.

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1. An encapsulated particle comprising:
a core particle; and
a polyurethane layer disposed about said core particle and comprising the reaction product of
an isocyanate component, and
an isocyanate-reactive component comprising a graft polyol having a continuous phase and polymeric particles selected from the group of styrene copolymer particles, polyurea particles, polyurethane particles, and combinations thereof.

2. An encapsulated particle as set forth in claim **1** wherein said graft polyol is a styrene acrylonitrile (SAN) polymer polyol.

3. An encapsulated particle as set forth in claim **2** wherein said polymeric particles comprise SAN copolymers.

4. An encapsulated particle as set forth in claim **3** wherein said polymeric particles are present in said isocyanate-reactive component in an amount of from about 5 to about 70 parts by weight based on 100 parts by weight of said isocyanate-reactive component.

5. An encapsulated particle as set forth in claim **4** wherein said polymeric particles have a weight ratio of styrene to acrylonitrile of from about 30:70 to about 70:30.

6. An encapsulated particle as set forth in claim **1** wherein said graft polyol is selected from the group of polyharnstoff (PHD) polyols, polyisocyanate polyaddition (PIPA) polyols, and combinations thereof.

7. An encapsulated particle as set forth in claim **1** wherein said isocyanate component is selected from the group of polymeric diphenylmethane diisocyanates (PMDI), diphenylmethane diisocyanates (MDI), and combinations thereof.

8. An encapsulated particle as set forth in claim **1** wherein said continuous phase comprises a polyol having at least two hydroxyl functional (OH) groups.

9. An encapsulated particle as set forth in claim **8** wherein said polyol is a hydrophobic polyol.

10. An encapsulated particle as set forth in claim **8** wherein said continuous phase comprises castor oil.

11. An encapsulated particle as set forth in claim **1** wherein said polyurethane layer is substantially free of water.

12. An encapsulated particle as set forth in claim **1** wherein said polyurethane layer is anhydrous.

13. An encapsulated particle as set forth in claim **1** wherein said polyurethane layer has an average thickness of from about 50 to about 200 microns.

14. An encapsulated particle as set forth in claim **1** wherein said polyurethane layer includes a concentration of said isocyanate-reactive component proximal to said core particle and a concentration of said isocyanate component distal to said core particle and adjacent to said concentration of said isocyanate-reactive component.

15. An encapsulated particle as set forth in claim **1** wherein said polyurethane layer includes a concentration of said isocyanate component proximal to said core particle and a concentration of said isocyanate-reactive component distal to said core particle and adjacent to said concentration of said isocyanate component.

16. An encapsulated particle as set forth in claim **1** wherein said core particle comprises a fertilizer.

17. An encapsulated particle as set forth in claim **16** wherein said fertilizer is selected from the group of nitrogen, phosphate, potash, sulfur, and combinations thereof.

18. An encapsulated particle comprising:

a core particle comprising a fertilizer; and

a polyurethane layer disposed about said core particle and comprising the reaction product of

an isocyanate component selected from the group of polymeric diphenylmethane diisocyanates (PMDI), diphenylmethane diisocyanates (MDI), and combinations thereof, and

an isocyanate-reactive component comprising a graft polyol having a continuous phase and polymeric particles selected from the group of styrene copolymer particles, polyurea particles, polyurethane particles, and combinations thereof, the continuous phase comprising a polyol having at least two hydroxyl functional (OH) groups.

19. An encapsulated particle as set forth in claim **18** wherein said graft polyol is selected from the group of styrene acrylonitrile (SAN) polymer polyols, polyharnstoff (PHD) polyols, polyisocyanate polyaddition (PIPA) polyols, and combinations thereof.

20. An encapsulated particle as set forth in claim **18** wherein said polyurethane layer is substantially free of water.

21. A method of forming an encapsulated particle, said method comprising the steps of:

providing a core particle;

applying an isocyanate component and an isocyanate-reactive component comprising a graft polyol having a continuous phase and polymeric particles selected from the group of styrene copolymer particles, polyurea particles, polyurethane particles, and combinations thereof to the core particle; and

reacting the isocyanate component and the isocyanate-reactive component to form a polyurethane layer disposed about the core particle to form the encapsulated particle.

22. A method as set forth in claim **21** wherein said isocyanate-reactive component is applied to the core particle prior to applying the isocyanate component to the core particle.

23. A method as set forth in claim **21** wherein said isocyanate component is applied to the core particle prior to applying the isocyanate-reactive component to the core particle.

24. A method as set forth in claim **21** further comprising the step of blending the isocyanate component and the isocyanate-reactive component to form a mixture prior to said step of applying the isocyanate component and the isocyanate-reactive component to the core particle.

25. A method as set forth in claim **21** wherein the graft polyol is selected from the group of styrene acrylonitrile (SAN) polymer polyols, polyharnstoff (PHD) polyols, polyisocyanate polyaddition (PIPA) polyols, and combinations thereof.

26. A method as set forth in claim **21** wherein the core particle comprises a fertilizer.