Claims

What is claimed is:

1. A method of forming a cured polymeric material, the method comprising:

providing a polymeric composition;

exposing the composition to ultraviolet (UV) radiation to thereby form an intermediate composition;

exposing the intermediate composition to electron beam (EB) radiation to thereby form a cured polymeric material.

2. The method of claim 1 wherein the UV radiation has a wavelength within a range of from 200 nm to 500 nm.

3. The method of claim 1 wherein the UV radiation has a wavelength within a range of from 300 nm to 500 nm.

4. The method of any one of claims 1-3 wherein the electron beam radiation is at a dosage of less than 10 kiloGray.

5. The method of any one of claims 1-3 wherein the electron beam radiation is at a dosage within a range of from 10 kiloGray to 100 kiloGray.

6. The method of any one of claims 1-5 wherein the polymeric composition comprises (i) at least one low molecular weight polymer, (ii) at least one monomer diluent, (iii) acrylic acid, and (iv) at least one photoinitiator.

7. The method of claim 6 wherein the composition further comprises at least one crosslinker.

8. The method of any one of claims 1-7 wherein the composition is free of solvents.

9. The method of any one of claims 6-8 wherein the low molecular weight polymer is a crosslinkable acrylate polymer.

10. A method of forming a cured polyacrylate material, the method comprising:

providing an acrylic composition including: (i) at least one low molecular weight polymer, (ii) at least one monomer diluent, (iii) acrylic acid, and (iv) at least one photoinitiator;

subjecting the acrylic composition to ultraviolet (UV) radiation to at least partially cure the composition and thereby form an intermediate composition;

subjecting the intermediate composition to electron beam (EB) radiation to thereby form a cured polyacrylate material.

11. The method of claim 10 wherein the UV radiation has a wavelength within a range of from 200 nm to 500 nm.

12. The method of claim 10 wherein the UV radiation has a wavelength within a range of from 300 nm to 500 nm.

13. The method of any one of claims 10-12 wherein the electron beam radiation is at a dosage of less than 10 kiloGray.

14. The method of any one of claims 10-12 wherein the electron beam radiation is at a dosage within a range of from 10 kiloGray to 100 kiloGray.

15. The method of claim 10 wherein the composition further comprises at least one crosslinker.

16. The method of any one of claims 10-15 wherein the composition is free of solvents.

17. A radiation curable acrylic composition comprising:

at least one low molecular weight acrylic polymer;

at least one monomer diluent;

acrylic acid; and

at least one photoinitiator;

wherein the composition is free of solvents.

18. The composition of claim 17 further comprising:

at least one crosslinker.

19. A polymeric material at least partially cured by sequential exposure to ultraviolet (UV) radiation followed by exposure to electron beam (EB) radiation.

20. The polymeric material of claim 19 wherein the polymeric material prior to exposure to UV radiation comprises (i) at least one low molecular weight polymer, (ii) at least one monomer diluent, (iii) acrylic acid, and (iv) at least one photoinitiator.

21. The polymeric material of any one of claims 19-20 wherein the UV radiation has a wavelength within a range of from 200 nm to 500 nm.

22. The polymeric material of any one of claims 19-20 wherein the UV radiation has a wavelength within a range of from 300 nm to 500 nm.

23. The polymeric material of any one of claims 19-22 wherein the electron beam radiation is at a dosage of less than 10 kiloGray.

24. The polymeric material of any one of claims 19-22 wherein the electron beam radiation is at a dosage within a range of from 10 kiloGray to 100 kiloGray.

Claims

1. A method of forming a cured polymeric material, the method comprising:

providing a polymeric composition;

exposing the composition to ultraviolet (UV) radiation to thereby form an intermediate composition;

exposing the intermediate composition to electron beam (EB) radiation to thereby form a cured polymeric material.

2. The method of claim 1 wherein the UV radiation has a wavelength within a range of from 200 nm to 500 nm.

3. The method of claim 1 wherein the UV radiation has a wavelength within a range of from 300 nm to 500 nm.

4. The method of claim 1 wherein the electron beam radiation is at a dosage of less than 10 kiloGray.

5. The method of claim 1 wherein the electron beam radiation is at a dosage within a range of from 10 kiloGray to 100 kiloGray.

6. The method of claim 1 wherein the polymeric composition comprises (i) at least one low molecular weight polymer, (ii) at least one monomer diluent, (iii) acrylic acid, and (iv) at least one photoinitiator.

7. The method of claim 6 wherein the composition further comprises at least one crosslinker.

8. The method of claim 1 wherein the composition is free of solvents.

9. The method of claim 6 wherein the low molecular weight polymer is a crosslinkable acrylate polymer.