Claims

What is claimed is:

1. An injection molded article comprising a thermoplastic polyurethane composition, wherein the thermoplastic polyurethane composition comprises the reaction product of a hydroxyl terminated intermediate component, wherein the hydroxyl terminated intermediate component comprises poly(ethylene glycol), an isocyanate component, wherein the isocyanate component is hexamethylene diisocyanate, and a chain extender component, wherein the thermoplastic polyurethane composition has a crystallization temperature of at least 75°C measured by DSC, wherein the isocyanate component and optional chain extender component make up a hard segment of the thermoplastic polyurethane and wherein the thermoplastic polyurethane comprises 13 wt % to 30 wt% hard segment, and wherein the thermoplastic polyurethane composition has a water absorption range of at least 100% as measured by ASTM D570.

2. The injection molded article of claim 1 wherein the hydroxyl terminated intermediate component consists of poly (ethylene glycol).

3. A method of making an injection molded article comprising:

preparing a thermoplastic polyurethane composition comprising a hydroxyl terminated intermediate component, wherein the hydroxyl terminated intermediate component comprises poly(ethylene glycol) an isocyanate component, wherein the isocyanate component is hexamethylene diisocyanate, and a chain extender component, wherein the thermoplastic polyurethane composition has a crystallization temperature of at least 75°C measured by DSC, wherein the isocyanate component and optional chain extender component make up a hard segment of the thermoplastic polyurethane and wherein the thermoplastic polyurethane comprises 13 wt % to 30 wt% hard segment, and wherein the thermoplastic polyurethane composition has a water absorption range of at least 100% as measured by ASTM D570;

heating said thermoplastic polyurethane composition to a temperature of 120 °C to 190°C to melt said thermoplastic polyurethane composition;

injecting said melted thermoplastic polyurethane composition into a mold; and

cooling said thermoplastic polyurethane composition to form an article.

4. The method of any of claim 3 wherein the hydroxyl terminated intermediate component consists of poly (ethylene glycol).

5. The use of a thermoplastic polyurethane composition comprising the reaction product of a hydroxyl terminated intermediate component, wherein the hydroxyl terminated intermediate component comprises poly(ethylene glycol), an isocyanate component, wherein the isocyanate component is hexamethylene diisocyanate, and a chain extender component in injection molding to form an article, wherein the thermoplastic polyurethane composition has a crystallization temperature of at least 75°C measured by DSC, wherein the isocyanate component and optional chain extender component make up a hard segment of the thermoplastic polyurethane and wherein the thermoplastic polyurethane comprises 13 wt % to 30 wt% hard segment, and wherein the thermoplastic polyurethane composition has a water absorption range of at least 100% as measured by ASTM D570.

6. The use of a thermoplastic polyurethane composition as recited in claim 5 wherein the hydroxyl terminated intermediate component consists of poly (ethylene glycol).

7. A 3D printed article comprising a thermoplastic polyurethane composition, wherein the thermoplastic polyurethane composition comprises the reaction product of a hydroxyl terminated intermediate component, wherein the hydroxyl terminated intermediate component comprises poly(ethylene glycol), an isocyanate component, wherein the isocyanate component is hexamethylene diisocyanate, and a chain extender component, wherein the thermoplastic polyurethane composition has a crystallization temperature of at least 75°C measured by DSC, wherein the isocyanate component and optional chain extender component make up a hard segment of the thermoplastic polyurethane and wherein the thermoplastic polyurethane comprises 13 wt % to 30 wt% hard segment, and wherein the thermoplastic polyurethane composition has a water absorption range of at least 100% as measured by ASTM D570.

8. The 3D printed article of claim 7 wherein the hydroxyl terminated intermediate component consists of poly (ethylene glycol).

9. A method of making a 3D printed comprising:

preparing a thermoplastic polyurethane composition comprising a hydroxyl terminated intermediate component, wherein the hydroxyl terminated intermediate component comprises poly(ethylene glycol), an isocyanate component, wherein the isocyanate component is hexamethylene diisocyanate, and a chain extender component, wherein the thermoplastic polyurethane composition has a crystallization temperature of at least 75°C measured by DSC,

wherein the isocyanate component and optional chain extender component make up a hard segment of the thermoplastic polyurethane and wherein the thermoplastic polyurethane comprises 13 wt % to 30 wt% hard segment, and wherein the thermoplastic polyurethane composition has a water absorption range of at least 100% as measured by ASTM D570;

operating a system for solid freeform fabrication of an object, wherein said system comprises a solid freeform fabrication apparatus that deposits small beads of building material in a controlled manner,

wherein the building material comprises the thermoplastic polyurethane composition.

10. The method of claim 9 wherein the hydroxyl terminated intermediate component consists of poly (ethylene glycol).

11. The use of a thermoplastic polyurethane composition comprising the reaction product of a hydroxyl terminated intermediate component, wherein the hydroxyl terminated intermediate component comprises poly(ethylene glycol), an isocyanate component, wherein the isocyanate component is hexamethylene diisocyanate (HDI), and a chain extender component in a solid freeform fabrication apparatus to form an article, wherein the thermoplastic polyurethane composition has a crystallization temperature of at least 75°C measured by DSC, wherein the isocyanate component and optional chain extender component make up a hard segment of the thermoplastic polyurethane and wherein the thermoplastic polyurethane comprises 13 wt % to 30 wt% hard segment, and wherein the thermoplastic polyurethane composition has a water absorption range of at least 100% as measured by ASTM D570.

12. The use of a thermoplastic polyurethane composition as recited in claim 11 wherein the hydroxyl terminated intermediate component consists of poly (ethylene glycol).