CLAIMS

1. A method of making an article comprising:

(1) providing a disperse dyed fabric comprising a melt-spun thermoplastic polyurethane fiber, wherein the melt-spun thermoplastic polyurethane fiber comprises the reaction product of (a) a reactive thermoplastic polyurethane composition comprising (i) a polyol component, wherein the polyol component comprises a co-polymer diol derived from caprolactone monomer and a polyether polyol, (ii) a hydroxyl terminated chain extender component, and (iii) a first diisocyanate component; and (b) an isocyanate functional prepolymer crosslinker and a second fiber selected from a thermoplastic polyurethane fiber, polyester fiber, nylon fiber, acrylic fiber, polypropylene fiber, or mixtures thereof;

(2) shredding the fabric;

(3) thermally treating the shredded fabric to form granules;

(4) melting and shearing the granules in an extruder to form an article.

2. The method of claim 1, wherein the fabric comprises up to 99% or up to 70% polyester fibers.

3. The method of any of claims 1 or 2, wherein the co-polymer comprises the reaction product of caprolactone monomer polyol and poly(tetramethylene ether glycol).

4. The method of claim 3, wherein the co-polymer comprises the reaction product of 50% by weight caprolactone monomer polyol and 50% by weight poly(tetramethylene ether glycol).

5. The method of any of claims 1 to 4, wherein the copolymer has a number average of about 2000 Daltons.

6. The method of any of claims 1 to 4, wherein the chain extender component consists of 1,4-bis(β-hydroxyethoxy)benzene.

7. The method of claim 6, wherein the chain extender component further comprises a co-chain extender, optionally wherein the co-chain extender is selected from ethylene glycol, diethylene glycol, propylene glycol, dipropylene glycol, 1,4-butanediol, 1,6-hexanediol, 1,3-butanediol, 1,5-pentanediol, neopentyl glycol, 1,4-cyclohexanedimethanol, 2,2-bis[4-(2-hydroxyethoxy) phenyl]propane, hexamethylene diol, heptanediol, nonanediol, dodecanediol, 3-methyl-1,5-pentanediol, ethylenediamine, butanediamine, hexamethylenediamine, hydroxyethyl resorcinol and mixtures thereof.

8. The method of any of claims 1 to 7, wherein the first diisocyanate component comprises or consists of an aromatic diisocyanate, optionally comprising 4,4'-diphenylmethane diisocyanate.

9. The method of any of claims 1 to 8, wherein the reactive thermoplastic polyurethane composition contains 50% to 80% by weight or 60% to 80% by weight or 70% to 80% by weight of the polyol component, 5% to 25% by weight or 5% to 15% by weight or 5% to 10% of the chain extender component and 15% to 30% by weight or 15% to 25% by weight, or 15% to 20% by weight of the first diisocyanate.

10. The method of any of claims 1 to 11, wherein the isocyanate functional prepolymer crosslinking agent comprises or consists of the reaction product of: (i) a poly(tetramethylene ether glycol) and a second diisocyanate component; or (ii) neopentyl glycol adipate and a second diisocyanate component.

11. The method of claim 10, wherein the second diisocyanate component comprises an aromatic diisocyanate, 4,4´-methylenebis(phenyl isocyanate), an aliphatic diisocyanate or dicyclohexylmethane-4,4´-diisocyanate.

12. The method of any of claims 1 to 11, further comprising the steps of providing a second polymer material and adding said second polymer to the extruder with the granules.

13. The method of claim 12, wherein the second polymer is selected from polyester or thermoplastic polyurethane.

14. A method of making an article comprising the steps of:

(1) providing a disperse dyed fabric comprising (i) a first fiber component is a thermoplastic hard yarn having 10% to 200% or 10% to 75% or 10% to 60% ultimate elongation measured according to ASTM D2256 and (ii) a second fiber component comprising a melt-spun thermoplastic polyurethane fiber having at least 300% ultimate elongation measured according to ASTM D2731, wherein the first fiber component and the second fiber component are knitted together for form the fabric and wherein the fabric is dyed at a temperature of at least 130°C, and wherein the second fiber component is a melt-spun thermoplastic fiber comprising the reaction product of a polyol component, wherein the polyol component comprises a co-polymer diol derived from caprolactone monomer and poly(tetramethylene ether glycol); a hydroxyl terminated chain extender component; and a first diisocyanate component; and an isocyanate functional prepolymer cross-linking agent;

(2) shredding the fabric;

(3) thermally treating the shredded fabric to form granules; and

(4) melting and shearing the granules in an extruder to form an article.

15. The method of claim 14, wherein the melt-spun thermoplastic polyurethane fiber exhibits hysteresis after 5th load and un-load cycle of

(a) at 100% elongation has hysteresis of less than 30%
(b) at 150% elongation has hysteresis of less than 30%
(c) at 200% elongation has hysteresis of less than 30%
wherein hysteresis is measured according to per ASTM D2731.

16. The method of claim 14, wherein the co-polymer diol comprises the reaction product of 50% by weight caprolactone monomer polyol and 50% by weight poly(tetramethylene ether glycol).

17. The method of claim 14 or 16, wherein the melt-spun thermoplastic polyurethane fiber has a weight average molecular weight measured by gel permeation chromatography of 300,000 to 450,000.

18. The method of any of claims 14 to 17, wherein the first diisocyanate component comprises or consists of an aromatic diisocyanate, optionally comprising 4,4'-diphenylmethane diisocyanate.

19. The method of any of claims 14 to 18, wherein the isocyanate functional prepolymer crosslinking agent comprises or consists of the reaction product of: (i) a poly(tetramethylene ether glycol) and a second diisocyanate component; or (ii) neopentyl glycol adipate and a second diisocyanate component.

20. The method of claim 19, wherein the second diisocyanate component comprises an aromatic diisocyanate, 4,4´-methylenebis(phenyl isocyanate), an aliphatic diisocyanate, or dicyclohexylmethane-4,4´-diisocyanate.

21. The fabric of claim 14, wherein the first fiber is selected from thermoplastic polyurethane fiber, polyester fiber, nylon fiber, cotton fiber, wool fiber, acrylic fiber, polypropylene fiber, viscose-rayon fiber, or mixtures thereof.