WHAT IS CLAIMED IS:

1. A method for manufacturing a thermoplastic polymer foaming sole, comprising:

(a) forming a prototype, the prototype comprising thermoplastic polyurethane or thermoplastic polyester elastomer but excluding a cross-linking agent and a foaming agent, the prototype being sole-shaped, wherein a thickness of the prototype is larger than or equal to 2 mm and smaller than or equal to 8 mm; and

(b) using a supercritical fluid to foam the prototype so as to directly get the thermoplastic polymer foaming sole;

wherein a density of the thermoplastic polymer foaming sole is larger than or equal to 0.5 g/cm^3 and smaller than or equal to 0.8 g/cm^3.

2. The method of claim 1, wherein the thermoplastic polymer foaming sole is amplified in proportion to the prototype.

3. The method of claim 1, wherein the supercritical fluid is carbon oxide, water, methane, ethane, ethylene, propylene, methanol, ethanol, acetone or nitrogen.

4. The method of claim 1, wherein a temperature for foaming the prototype in step (b) is larger than or equal to 95 ^{o}C and smaller than or equal to 180 ^{o}C.

5. The method of claim 1, wherein a pressure of the supercritical fluid is larger than or equal to 1000 psi and smaller than or equal to 3000 psi.

6. The method of claim 1, wherein the prototype in step (a) is form by an injection molding process, an extrusion process, a hot pressing process or a casting mold process.

7. A method for manufacturing a thermoplastic polymer foaming sole, comprising:

(a) forming a liquid base material, the liquid base material comprising thermoplastic polyurethane or thermoplastic polyester elastomer;

(b) infusing the liquid base material into a shaping mold so as to form the liquid base material into a prototype, wherein a thickness of the prototype is larger than or equal to 2 mm and smaller than or equal to 8 mm;

(c) disposing the prototype in a foaming mold;

(d) introducing a supercritical fluid in the foaming mold to allow the supercritical fluid to penetrate into the prototype; and

(e) depressurizing the foaming mold to allow the prototype to foam into the thermoplastic polymer foaming sole;

wherein a density of the thermoplastic polymer foaming sole is larger than or equal to 0.5 g/cm^3 and smaller than or equal to 0.8 g/cm^3.

8. The method of claim 7, wherein the thermoplastic polymer foaming sole is amplified in proportion to the prototype.

9. The method of claim 7, wherein a temperature for foaming the prototype in step (d) is larger than or equal to 95 ^{o}C and smaller than or equal to 180 ^{o}C.

10. The method of claim 7, wherein a pressure of the supercritical fluid in step (d) is larger than or equal to 1000 psi and smaller than or equal to 3000 psi.