CLAIMS:

1. A method of fabricating a polishing pad having a density of less than or equal to 0.37 g/cc, the method comprising:

mixing a pre-polymer and a chain extender or cross-linker with a plurality of unexpanded microelements and a plurality of pre-expanded microelements to form a mixture, each of the plurality of unexpanded microelements having an initial size; and

heating the mixture, in a formation mold to provide a molded polishing body comprising a thermoset polyurethane material and a first plurality of closed cell pores and a second plurality of closed cell pores dispersed in the thermoset polyurethane material, the first plurality of closed cell pores formed by expanding each of the plurality of unexpanded microelements to a final, larger size during the heating, wherein the heating is performed at a low temperature such that a size of each of the plurality of pre-expanded microelements is the same before and after the heating to provide the second plurality of closed cell pores in the molded polishing body.

2. The method of claim 1, wherein expanding each of the plurality of unexpanded microelements to the final size comprises:

increasing a volume of each of the plurality of unexpanded microelements by a factor in the range of 3 – 1000; or

providing a final diameter of each of the plurality of unexpanded microelements in the range of 10-200 microns; or

reducing a density of each of the plurality of unexpanded microelements by a factor in the range of 3-1000; or

forming a spherical shape for each of the plurality of unexpanded microelements of the final size.

3. The method of claim 1, wherein the heating is performed at a temperature of 100 degrees Celsius or less, and wherein the plurality of pre-expanded microelements has an expansion threshold of greater than 130 degrees Celsius.

4. The method of claim 1, wherein the plurality of pre-expanded microelements has an expansion threshold greater than an expansion threshold of the plurality of unexpanded microelements.

5. The method of claim 4, wherein the expansion threshold of the plurality of pre-expanded microelements is greater than 120 degrees Celsius, and the expansion threshold of the plurality of unexpanded microelements is less than 110 degrees Celsius.

6. The method of claim 1, wherein a mixture of the pre-polymer, the chain extender or cross-linker, and the plurality of pre-expanded microelements has a viscosity, and the mixture of the pre-polymer, the chain extender or cross-linker, the plurality of unexpanded microelements having the initial size, and the plurality of pre-expanded microelements has the viscosity.

7. The method of claim 6, wherein either:

the viscosity is a predetermined viscosity, and a relative amount of the plurality of

pre-expanded microelements in the mixture is selected based on the predetermined viscosity; or

the plurality of unexpanded microelements has little to no effect on the viscosity of the mixture.

8. The method of claim 1, wherein heating provides the molded polishing body comprising the thermoset polyurethane material, the first plurality of closed cell pores dispersed in the thermoset polyurethane material and formed by expanding each of the plurality of unexpanded microelements to the final size having a first diameter mode with a first peak of size distribution, and the second plurality of closed cell pores dispersed in the thermoset polyurethane material and formed from the plurality of pre-expanded microelements having a second diameter mode with a second, different, peak of size distribution;
optionally wherein the first plurality of closed cell pores and the second plurality of closed cell pores provides a total pore volume in the thermoset polyurethane material in the range of 55 - 80 % of the total volume of the thermoset polyurethane material.

9. The method of claim 1, wherein heating the mixture to provide the molded polishing body comprises forming the polishing body having a density of less than 0.5 g/cc;

optionally wherein the mixture has a density of greater than 0.5 g/cc prior to the heating

10. The method of claim 1, wherein the mixing further comprises either:
injecting a gas into the pre-polymer and the chain extender or cross-linker, or into a product formed there from; or

adding an opacifying filler to the pre-polymer and the chain extender or cross-linker to provide an opaque molded polishing body.

11. The method of claim 1, wherein the pre-polymer is an isocyanate and the mixing further comprises adding water to the pre-polymer.

12. The method of claim 1, wherein mixing the pre-polymer and the chain extender or cross-linker comprises mixing an isocyanate and an aromatic diamine compound, respectively.

13. The method of claim 1, wherein heating the mixture comprises first partially curing in the formation mold and then further curing in an oven.

14. The method of claim 1, wherein heating in the formation mold comprises forming a groove pattern in a polishing surface of the molded polishing body.

15. The method of claim 1, wherein each of the plurality of microelements having the initial size comprises a physical shell, and wherein each of the plurality of microelements having the final size comprises an expanded physical shell.