CLAIMS

What is claimed is:

1. An article, comprising:

at least two webs, and

an embossed seal joining a portion of the at least two webs, the seal comprising concentric discrete extended elements surrounded by lands formed in the at least two webs, the discrete extended elements having open proximal ends and portions of the discrete extended element having a thickness less than that of the lands.

2. The article of claim 1, wherein the embossed seal is free of adhesives.

3. The article of any one of claims of the preceding claims, wherein the concentric discrete extended elements have not been fused together by melting.

4. The article of any one of the preceding claims, wherein distal ends and/or sidewalls of the discrete extended elements are thinned by at least about 25% relative to the lands.

5. The article of any one of the preceding claims, wherein at least two webs are selected from the group consisting of polypropylene, polyethylene, and combinations thereof.

6. The article of any one of the preceding claims, further comprising an unsealed portion disposed adjacent to the embossed seal, the unsealed portion comprising portions of the at least two webs that are substantially free of concentric discrete extended elements.

7. The article of claim 5, wherein the embossed seal is disposed along opposing sides of the at least two webs and the unsealed portion is disposed between the opposing sides having the embossed seal.

8. A process comprising:

feeding at least two webs between a pressure source and a forming structure comprising a plurality of discrete forming elements selected from the group

consisting of discrete apertures, discrete depressions, discrete protruded elements, and combinations thereof; and,

applying pressure from the pressure source against the webs and the forming structure sufficient to conform the at least two webs to the discrete forming elements of the forming structure to form an embossed seal comprising a plurality of concentric discrete extended elements having open proximal ends.

9. The process of claim 8, wherein the pressure source is selected from the group consisting of a static pressure plenum, a compliant substrate, a velocity pressure source, and combinations thereof.

10. The process of any one of claims 8 or 9, wherein the applied pressure is about 1 MPa to about 100 MPa.

11. The process of any one of claims 8 to 10, comprising applying pressure for a dwell time of about 0.5 millisecond to about 50 milliseconds.

12. The process of any one of claims 8 to 11, wherein the temperature of the webs during the process is less than the melting point of the webs, preferably at least about 10°C below the melting point of the webs.

13. The process of any one of claims 8 to 12, wherein the applied pressure is sufficient to stretch the webs beyond the yield points of the webs.

14. The process of any one of claims 8 to 13, wherein the webs are selected from the group consisting of polypropylene, polyethylene, and combinations thereof.

15. The process of any one of claims 8 to 14, wherein the embossed seal is free from adhesives.

16. The process of any one of claims 8 to 15, wherein the embossed seal is formed without fusing the webs together in a melted state.

CLAIMS

1. An article, comprising:

at least two webs, and

an embossed seal joining a portion of the at least two webs, the seal comprising concentric discrete extended elements surrounded by lands formed in the at least two webs, the discrete extended elements having open proximal ends and portions of the discrete extended elements having a thickness less than that of the lands, wherein the discrete extended elements have an aspect ratio of at least about 0.2.

2. The article of Claim 1, wherein the embossed seal is free of adhesives.

3. The article of Claim 1 or 2, wherein the concentric discrete extended elements have not been fused together by melting.

4. The article of any one of Claims 1 to 3, wherein distal ends and/or sidewalls of the discrete extended elements are thinned by at least about 25% relative to the lands.

5. The article of any one of Claims 1 to 4, wherein the at least two webs comprise a material selected from the group consisting of synthetic material, metallic material, biological material, and combinations thereof.

6. The article of any one of Claims 1 to 4, wherein the at least two webs are selected from the group consisting of films, foils, synthetic fibrous nonwovens, webs comprising sustainable polymers, foams, and laminates thereof.

7. The article of any one of Claims 1 to 4, wherein at least two webs are selected from the group consisting of polypropylene, polyethylene, and blends thereof.

8. The article of any one of Claims 1 to 7, wherein the at least two webs comprise the same material.

9. The article of any one of Claims 1 to 7, wherein the at least two webs comprise different materials.

10. The article of any one of Claims 1 to 9, wherein the discrete extended elements have a height at least substantially equal to a thickness of the web.

11. The article of any one of Claims 1 to 10, wherein the discrete extended elements have closed distal ends.

12. The article of any one of Claims 1 to 10, wherein the discrete extended elements have open distal ends.

13. The article of any one of Claims 1 to 12, wherein each web has a thickness of about 5 microns to about 150 microns.

14. The article of any one of Claims 1 to 13, wherein the discrete extended elements have a diameter of about 50 microns to about 5,000 microns.

15. The article of any one of Claims 1 to 14, further comprising an unsealed portion disposed adjacent to the embossed seal, the unsealed portion comprising portions of the at least two webs that are substantially free of concentric discrete extended elements.

16. The article of Claim 15, wherein the embossed seal is disposed along opposing sides of the at least two webs and the unsealed portion is disposed between the opposing sides having the embossed seal.

17. A process comprising:

feeding at least two webs between a pressure source and a forming structure comprising a plurality of discrete forming elements selected from the group consisting of discrete apertures, discrete depressions, discrete protruded elements, and combinations thereof; and,

applying pressure from the pressure source against the webs and the forming structure sufficient to conform the at least two webs to the discrete forming elements of the forming structure to form an embossed seal comprising a plurality of concentric discrete extended elements having open proximal ends and portions of the discrete extended elements having a thickness less than that of the lands, wherein the discrete extended elements have an aspect ratio of at least about 0.2.

18. The process of Claim 17, wherein the pressure source is selected from the group consisting of a static pressure plenum, a compliant substrate, a velocity pressure source, and combinations thereof.

19. The process of Claim 17 or 18, wherein the applied pressure is about 1 MPa to about 100 MPa.

20. The process of Claim 17, wherein pressure source is a compliant substrate.

21. The process of Claim 20, wherein the compliant substrate has a Shore A hardness of about 30 durometers to about 90 durometers.

22. The process of Claim 17, wherein the pressure source is a static pressure plenum.

23. The process of Claim 22, wherein the static pressure plenum is a static gas pressure plenum, wherein the gas comprises at least one gas selected from the group consisting of nitrogen, air, carbon dioxide, and mixtures thereof.

24. The process of any one of Claims 17 to 23, comprising feeding the webs at a rate of at least about 1 meter per second.

25. The process of any one of Claims 17 to 24, comprising applying pressure for a dwell time of about 0.5 millisecond to about 50 milliseconds.

26. The process of any one of Claims 17 to 25, wherein the temperature of the webs during the process is less than the melting point of the webs.

27. The process of Claim 26, wherein the temperature of the webs is at least about 10°C below the melting point of the webs.

28. The process of any one of Claims 17 to 27, wherein the discrete forming elements of the forming structure having an average diameter of about 10 microns to about 5000 microns.

29. The process of any one of Claims 17 to 28, wherein the applied pressure is sufficient to stretch the webs beyond the yield points of the webs.

30. The process of any one of Claims 17 to 29, wherein the webs are selected from the group consisting of polypropylene, polyethylene, and blends thereof.

31. The process of any one of Claims 17 to 30, wherein the embossed seal is free from adhesives.

32. The process of any one of Claims 17 to 31, wherein the embossed seal is formed without fusing the webs together in a melted state.