What is claimed is:

1. A method of making a stretchable and bendable apparatus comprising:

depositing a first elastomer material on a panel;

laminating trace material on the elastomer material;

processing the trace material to pattern the trace material into one or more traces and one or more bond pads;

attaching a die to the one or more bond pads; and

depositing a second elastomer material on and around the one or more traces, the bonds pads, and the die to encapsulate the one or more traces and the one or more bond pads in the first and second elastomer materials.

2. The method of claim 1, wherein processing the trace material includes processing the trace material so as to form a trace with a thickness of less than about 500 nanometers.

3. The method of claim 2, further comprising:

situating a first trace encapsulation material on the first elastomer material before laminating the trace material on the first elastomer material; and

selectively removing portions of the first trace encapsulation material

to pattern the first trace encapsulation material.

4. The method of claim 3, further comprising:

situating a second trace encapsulation material on the one or more traces; and

selectively removing portions of the second trace encapsulation material.

5. The method of claim 1, further comprising:

releasing the first elastomer material from the panel; and

singulating a bendable and stretchable device after releasing the first elastomer material.

6. The method of claim 1, wherein processing the trace material includes processing the trace material so as to form a trace with a thickness of between about 500 nanometers and twenty-five micrometers.

7. The method of any one of claims 1-6, wherein attaching a die to the one or more bond pads includes attaching a die that is between about ten and three hundred micrometers thick.

8. The method of any one of claims 1-6, wherein attaching a die to the one or more bond pads includes wire bonding the die to the one or more bond pads.

9. The method of any one of claims 1-6, wherein attaching a die to the one or more bond pads includes solder bonding the die to the one or more bond pads.

10. A method of making a stretchable and bendable apparatus comprising:

depositing a sacrificial material on a panel;

laminating trace material on the sacrificial material;

processing the trace material to pattern the trace material into one or more traces and one or more bond pads;

attaching a first die to the one or more bond pads at a first side of the one or more bond pads;

depositing a first elastomer material on and around the one or more traces, the one or more bond pads, and the first die;

releasing the sacrificial material, one or more traces, the one or more bond pads, the first die, and the first elastomer material from the panel;

removing the sacrificial material; and

depositing a second elastomer material on the one or more traces, the one or more bonds pads, and the first elastomer material to encapsulate the one or more traces and the one or more bond pads in the first and second elastomer materials.

11. The method of claim 10, wherein processing the trace material includes processing the trace material so as to form a trace with a thickness of less than about 500 nanometers.

12. The method of claim 11, further comprising:

situating a first trace encapsulation material on the sacrificial material before laminating the trace material on the sacrificial material; and

selectively removing portions of the first trace encapsulation material

to pattern the first trace encapsulation material.

13. The method of claim 12, further comprising:

situating a second trace encapsulation material on the one or more traces; and

selectively removing portions of the second trace encapsulation material.

14. The method of claim 10, further comprising:

singulating a bendable and stretchable device after releasing the first elastomer material.

15. The method of claim 10, wherein processing the trace material includes processing the trace material so as to form a trace with a thickness of between about 500 nanometers and twenty-five micrometers.

16. The method of any one of claims 10-15, wherein attaching the first die to the one or more bond pads includes attaching a die that is between about ten and three hundred micrometers thick.

17. The method of any one of claims 10-15, wherein attaching the first die to the one or more bond pads includes wire bonding the first die to the one or more bond pads.

18. The method of any one of claims 10-15, wherein attaching the first die to the one or more bond pads includes solder bonding the first die to the one or more bond pads.

19. The method of any one of claims 10-15, further comprising attaching a second die to a bond pad of the one or more bond pads at a second side of the one or more bond pads opposite the first side of the one or more bond pads.

20. An apparatus comprising:

an elastomer substrate;

a plurality of meandering traces encapsulated in the elastomer substrate;

a plurality of bond pads encapsulated in the elastomer substrate, wherein bond pads of the plurality of bond pads are electrically coupled through a meandering trace of the plurality of meandering traces;

a bendable electronic die with a thickness of between about ten and three hundred microns encapsulated in the elastomer substrate; and

electrical bonds coupling the die to the bond pads.

21. The apparatus of claim 20, wherein the traces are less than 500 nanometers thick and wherein the apparatus further comprises a material with an elastic modulus between an elastic modulus of the elastomer and the elastic modulus of the meandering traces mechanically supporting the traces.

22. The apparatus of claim 21, wherein the material is situated on two opposite sides of the traces.

23. The apparatus of claim 21, wherein the material is situated on only one side of the traces.

24. The apparatus of claim 21, wherein the material surrounds the traces.

25. The apparatus of any one of claims 20-24, wherein the elastomer includes PolyDiMethySiloxane (PDMS) and the traces include copper.

What is claimed is:

1. A method of making a stretchable and bendable apparatus comprising:

depositing a first elastomer material on a panel;

laminating trace material on the elastomer material;

processing the trace material to pattern the trace material into one or more traces and one or more bond pads;

attaching a die to the one or more bond pads; and

depositing a second elastomer material on and around the one or more traces, the bonds pads, and the die to encapsulate the one or more traces and the one or more bond pads in the first and second elastomer materials.

2. The method of claim 1, wherein processing the trace material includes processing the trace material so as to form a trace with a thickness of less than about 500 nanometers.

3. The method of claim 2, further comprising:

situating a first trace encapsulation material on the first elastomer material before laminating the trace material on the first elastomer material; and

selectively removing portions of the first trace encapsulation material to pattern the first trace encapsulation material.

4. The method of claim 3, further comprising:

situating a second trace encapsulation material on the one or more traces; and

selectively removing portions of the second trace encapsulation material.

5. The method of claim 1, further comprising:

releasing the first elastomer material from the panel; and

singulating a bendable and stretchable device after releasing the first elastomer material.

6. The method of claim 1, wherein processing the trace material includes processing the trace material so as to form a trace with a thickness of between about 500 nanometers and twenty-five micrometers.

7. The method of claim 1, wherein attaching a die to the one or more bond pads includes attaching a die that is between about ten and three hundred micrometers thick.

8. The method of claim 1, wherein attaching a die to the one or more bond pads includes wire bonding the die to the one or more bond pads.

9. The method of claim 1, wherein attaching a die to the one or more bond pads includes solder bonding the die to the one or more bond pads.

10. A method of making a stretchable and bendable apparatus comprising:

depositing a sacrificial material on a panel;

laminating trace material on the sacrificial material;

processing the trace material to pattern the trace material into one or more traces and one or more bond pads;

attaching a first die to the one or more bond pads at a first side of the one or more bond pads;

depositing a first elastomer material on and around the one or more traces, the one or more bond pads, and the first die;

releasing the sacrificial material, one or more traces, the one or more bond pads, the first die, and the first elastomer material from the panel;

removing the sacrificial material; and

depositing a second elastomer material on the one or more traces, the one or more bonds pads, and the first elastomer material to encapsulate the one or more traces and the one or more bond pads in the first and second elastomer materials.

11. The method of claim 10, wherein processing the trace material includes processing the trace material so as to form a trace with a thickness of less than about 500 nanometers.

12. The method of claim 11, further comprising:

situating a first trace encapsulation material on the sacrificial material before laminating the trace material on the sacrificial material; and

selectively removing portions of the first trace encapsulation material to pattern the first trace encapsulation material.

13. The method of claim 12, further comprising:

situating a second trace encapsulation material on the one or more traces; and

selectively removing portions of the second trace encapsulation material.

14. The method of claim 10, further comprising:

singulating a bendable and stretchable device after releasing the first elastomer material.

15. The method of claim 10, wherein processing the trace material includes processing the trace material so as to form a trace with a thickness of between about 500 nanometers and twenty-five micrometers.

16. The method of claim 10, wherein attaching the first die to the one or more bond pads includes attaching a die that is between about ten and three hundred micrometers thick.

17. The method of 10, wherein attaching the first die to the one or more bond pads includes wire bonding the first die to the one or more bond pads.

18. The method of claim 10, wherein attaching the first die to the one or more bond pads includes solder bonding the first die to the one or more bond pads.

19. The method of claim 10, further comprising attaching a second die to a bond pad of the one or more bond pads at a second side of the one or more bond pads opposite the first side of the one or more bond pads.

20. An apparatus comprising:

an elastomer substrate;

a plurality of meandering traces encapsulated in the elastomer substrate;

a plurality of bond pads encapsulated in the elastomer substrate, wherein bond pads of the plurality of bond pads are electrically coupled through a meandering trace of the plurality of meandering traces;

a bendable electronic die with a thickness of between about ten and three hundred microns encapsulated in the elastomer substrate; and

electrical bonds coupling the die to the bond pads.

21. The apparatus of claim 20, wherein the traces are less than 500 nanometers thick and wherein the apparatus further comprises a material with an elastic modulus between an elastic modulus of the elastomer and the elastic modulus of the meandering traces mechanically supporting the traces.

22. The apparatus of claim 21, wherein the material is situated on two opposite sides of the traces.

23. The apparatus of claim 21, wherein the material is situated on only one side of the traces.

24. The apparatus of claim 21, wherein the material surrounds the traces.

25. The apparatus of claim 20, wherein the elastomer includes PolyDiMethySiloxane (PDMS) and the traces include copper.