WHAT IS CLAIMED IS:

1. A method for manufacturing an electric sensor, comprising:

   (a) thermal transfer printing a conductive pattern defining at least one conductive trace onto a surface of a receiving substrate; and

   (b) securing at least a portion of the receiving substrate to at least a second substrate to form an enclosure, wherein at least a portion of the conductive pattern is positioned within the enclosure,

   wherein the conductive pattern is printed with a thermal transfer printer having a printhead density of at least 300 dpi.

2. The method of claim 1, wherein the sensor is a microfluidic device and the conductive pattern defines at least two electrodes positioned within a micro-channel of the microfluidic device.

3. The method of claim ~~2~~1, wherein the conductive pattern has at least a portion having a thickness of 1 micron or less.

4. The method of claim ~~2 or claim 3~~1, wherein the conductive pattern has at least one conductive trace having at least a portion having a width of 250 microns or less.

5. The method of claim ~~2 or claim 3~~1, wherein the conductive pattern has at least one conductive trace having at least a portion having a width of 50 microns or less.

~~6. The method of one of claims 2-5, wherein the conductive pattern comprises interdigitated microelectrodes.~~

~~7. The method of one of the preceding claims, wherein the conductive pattern is printed with a thermal transfer printer having a printhead density of at least 300 dpi.~~

~~8.~~6. The method of one of the preceding claims, wherein the conductive pattern comprises aluminum, silver, platinum, iron, graphite, or a derivative or combination thereof.

~~9.~~7. The method of claim ~~8~~6, wherein the conductive pattern comprises particles of aluminum, silver, platinum, iron, graphite, or a combination thereof.

8. A method for manufacturing an electric sensor, comprising:

(a) thermal transfer printing a conductive pattern defining at least one conductive trace onto a surface of a receiving substrate; and

(b) securing at least a portion of the receiving substrate to at least a second substrate to form an enclosure, wherein at least a portion of the conductive pattern is positioned within the enclosure,

wherein the sensor is a microfluidic device and the conductive pattern defines at least two electrodes positioned within a micro-channel of the microfluidic device, and

wherein the conductive pattern comprises interdigitated microelectrodes.

~~10.~~9. ~~The method of one of the preceding claims~~ A method for manufacturing an electric sensor, comprising:

(a) thermal transfer printing a conductive pattern defining at least one conductive trace onto a surface of a receiving substrate; and

(b) securing at least a portion of the receiving substrate to at least a second substrate to form an enclosure, wherein at least a portion of the conductive pattern is positioned within the enclosure,

wherein the conductive pattern comprises one or more conductive polymers.

~~11.~~10. ~~The method of claim 1~~A method for manufacturing an electric sensor, comprising:

(a) thermal transfer printing a conductive pattern defining at least one conductive trace onto a surface of a receiving substrate; and

(b) securing at least a portion of the receiving substrate to at least a second substrate to form an enclosure, wherein at least a portion of the conductive pattern is positioned within the enclosure,

wherein the enclosure comprises a fluid.

~~12.~~11. The method of claim 10, wherein the fluid comprises a reagent.

~~13.~~12. The method of claim 10, wherein the fluid comprises vapor.

~~14.~~13. ~~The method of claim 1~~A method for manufacturing an electric sensor, comprising:

(a) thermal transfer printing a conductive pattern defining at least one conductive trace onto a surface of a receiving substrate; and

(b) securing at least a portion of the receiving substrate to at least a second substrate to form an enclosure, wherein at least a portion of the conductive pattern is positioned within the enclosure,

wherein the non-conductive surface comprise a biological coating.

~~15.~~14. An electric sensor, comprising:

(a) an enclosure; and

(b) a plurality of thermal-transfer-printed conductive traces positioned at least partially within the enclosure,

wherein the conductive traces comprise interdigitated microelectrodes.

~~16.~~15. The sensor of claim ~~15~~14, wherein the sensor is a microfluidic device and the enclosure comprises a micro-channel and the plurality of conductive traces are at least partially positioned within the micro-channel.

~~17. The sensor of claim 15, wherein the conductive traces comprise interdigitated microelectrodes.~~

~~18.~~16. The sensor of claim ~~15~~14, wherein the conductive traces have one or more portions having a thickness of 1 micron or less.

~~19.~~17. The sensor of claim ~~15~~14, wherein the conductive traces have one or more portions having a width of 500 microns or less.

~~20.~~18. The sensor of claim ~~15~~14, wherein the conductive traces comprises particles of aluminum, silver, platinum, iron, graphite, or a combination thereof.

~~21.~~19. ~~The sensor of claim 15~~An electric sensor, comprising:

(a) an enclosure; and

(b) a plurality of thermal-transfer-printed conductive traces positioned at least partially within the enclosure,

wherein the plurality of thermal-transfer-printed conductive traces are printed on a biological coating.

~~22.~~20. ~~The sensor of claim 15~~An electric sensor, comprising:

(a) an enclosure; and

(b) a plurality of thermal-transfer-printed conductive traces positioned at least partially within the enclosure,

wherein the conductive traces have a first surface energy that is at least 5 Dynes/cm greater or lower than a surface energy of a surrounding material.

~~23.~~21. A microfluidic sensor comprising a body defining at least a first microfluidic channel, the microfluidic channel having at least one surface comprising at

least two different materials, wherein a first material has a first surface energy and a second material comprises a second surface energy that is at least 5 Dynes/cm greater than the first surface energy.

~~24.~~22. The microfluidic sensor of claim ~~23~~21, wherein the second material comprises thermal transfer printed material.

~~25.~~23. The microfluidic sensor of claim ~~23~~21, wherein the second material has a surface energy of greater than 45 Dynes/cm.

~~26.~~24. The microfluidic sensor of claim ~~25~~23, wherein the second material has a surface energy of greater than 60 Dynes/cm.

~~27.~~25. The microfluidic sensor of claim ~~23~~21, wherein the second material comprises a conductive material.

~~28.~~26. The microfluidic sensor of claim ~~27~~25, wherein one or more portions of the second material are connected to a power source to apply a potential to the second material to change wetting properties of the second material.

~~29.~~27. The microfluidic sensor of claim ~~27~~25, wherein the second material comprises aluminum particles.

~~30.~~28. The microfluidic sensor of one of claims ~~23~~21, ~~25~~23, and ~~26~~24, wherein the first material has a surface energy of less than 45 Dynes/cm.

~~31.~~29. The microfluidic sensor of claim ~~30~~28, wherein the first material has a surface energy of less than 40 Dynes/cm.

~~32.~~30. The microfluidic sensor of claim ~~23~~-21 or claim ~~29~~27, wherein the first material comprises pMMA.

~~33.~~31. The microfluidic sensor of one of claims ~~23-32~~21-30, wherein the second material has a thickness of 1 micron or less.