Claims

1. A piezoelectric sensor comprising:

a piezoelectric film formed by a solution coating process on a surface of an object to be monitored;

a plurality of electrodes formed on a surface of the piezoelectric film; and

wherein electrical polarization of the piezoelectric film is about coplanar with the surface of the piezoelectric film.

~~2. A piezoelectric sensor as claimed in claim 1, wherein the piezoelectric film is formed on the surface of the object by a solution coating process.~~

~~3.~~2. A piezoelectric sensor as claimed in claim 1 ~~or 2~~, wherein the electrodes comprise a pair of interdigital electrodes.

~~4.~~3. A piezoelectric sensor as claimed in claim 1 or 2, wherein the electrodes comprise a pair of circular electrodes.

~~5.~~4. A piezoelectric sensor as claimed in any one of the preceding claims, wherein the electrodes are formed on a surface of the piezoelectric film facing away from the object to be monitored.

~~6.~~5. A piezoelectric sensor as claimed in any one of the preceding claims, wherein an insulating layer is disposed between the piezoelectric film and the surface of the object to be monitored.

~~7.~~6. A piezoelectric sensor as claimed in claim ~~6~~5, wherein the insulating layer is a silicon dioxide.

~~8.~~7. A piezoelectric sensor as claimed in claim ~~6~~5, wherein the insulating layer is of a polymeric material.

~~9.~~8. A piezoelectric sensor as claimed in any one of the preceding claims, wherein the piezoelectric film comprises a ferroelectric polymer.

~~10.~~9. A piezoelectric sensor as claimed in any one of the preceding claims, wherein the piezoelectric film has a thickness of less than or equal to 10 μm.

~~11.~~10. A piezoelectric sensor array comprising a plurality of piezoelectric sensors as claimed in any one of the preceding claims, wherein electrodes of the plurality of piezoelectric sensors are placed at different orientations such that collective electrical output from the plurality of piezoelectric sensors determine strain distribution of the object.

~~12.~~11. A method of forming a piezoelectric sensor, the method comprising:

forming a piezoelectric film by a solution coating process on a surface of an object to be monitored;

forming electrodes on a surface of the piezoelectric film; and

orientating electrical polarization in the piezoelectric film to be about coplanar with the surface of the piezoelectric film.

~~13.~~12. The method as claimed in claim ~~12~~11, wherein forming the piezoelectric film comprises coating a polymer on the object and thermally treating the coated polymer.

~~14. The method as claimed in claim 13, wherein the coating is by solution coating selected from the group comprising dip-coating, spray-coating and spin-coating.~~

~~15.~~13. A method as claimed in claim ~~13 or 14~~12, wherein the polymer is a ferroelectric polymer.

~~16.~~14. A method as claimed in any one of claims ~~12~~ 11 to ~~15~~13, wherein orientating the electrical polarization in the piezoelectric film comprises applying an electric field through the electrodes to electrically pole the piezoelectric film after forming the piezoelectric film and the electrodes.

~~17.~~15. A method as claimed in any one of claims ~~12~~ 11 to ~~16~~14, wherein forming the electrodes comprises forming a pair of interdigital electrodes.

~~18.~~16. A method as claimed in claim ~~17~~15, wherein forming the pair of interdigital electrodes includes spacing the electrodes apart in a direction such that strain of the

surface of the object along the direction can be detected with electrical output from the electrodes.

~~19.~~17. A method as claimed in any one of claims ~~12~~ 11 to ~~16~~14, wherein forming the electrodes comprises forming a pair of circular interdigital electrodes.

~~20.~~18. A method as claimed in claim ~~19~~ 17 wherein forming the pair of circular interdigital electrodes is configured for allowing isotropic strain coplanar with the surface of the object to be detected with electrical output from the electrodes.

~~21.~~19. A method as claimed in any one of claims ~~12~~ 11 to ~~20~~18, wherein forming the electrodes includes patterning by a photolithographic process a conductive layer deposited on the piezoelectric film.

~~22.~~20. A method as claimed in any one of claims ~~12~~ 11 to ~~21~~19, further comprising forming an insulating layer on the surface of the object before forming the piezoelectric layer.

~~23.~~21. A method of forming a piezoelectric sensor array comprising forming a plurality of piezoelectric sensors as claimed in any one of claims ~~12~~ 11 to ~~22~~20, the method including forming electrodes of the plurality of piezoelectric sensors at different orientations such that collective electrical output from the plurality of piezoelectric sensors can determine strain distribution of the object.