CLAIMS

~~1. [Cancelled].~~

~~2~~1. A sensor for detecting or sensing moisture or wetness of an article to which the sensor is attached, the sensor comprising:

a first plate ~~(11)~~ and a second plate ~~(12)~~, the first plate and the second plate being electrically conductive,

wherein the first plate is separated and offset from the second plate by a dielectric intermediate layer ~~(20)~~,

wherein when seen in a perpendicular projection on a plane including the second plate, one of the following conditions is fulfilled:

the projection of the first plate on the plane does not overlap with the second plate; or

the projection of the first plate on the plane overlaps over less than 5% of the surface area of the second plate with the second plate;

said sensor further comprising a measurement means configured for measuring a value representative for an electrical charge influenced by moisture in the vicinity of the first plate.

~~3~~2. The sensor ~~(10)~~ according to claim 1 ~~or 2~~, wherein when seen in a projection on a plane including the second plate, the shape of the projection of the first plate on the plane is substantially complementary with the shape of the second plate.

~~4~~3. The sensor ~~(10)~~ of claim 1 or 2 ~~or 3~~, seen in a projection on a plane including the second plate, the projection of the first plate on the plane is at a distance (d) of the second plate.

~~5~~4. The sensor ~~(10)~~ of any one of claims 1 to ~~4~~3, wherein a portion of the second plate ~~(12)~~ is located on each side of the first plate ~~(11)~~.

~~6~~5. The sensor ~~(10)~~ of any one of claims 1 to ~~5~~4, wherein the second plate ~~(12)~~ comprises one or more further portions, located at or near one or more edges of the first plate ~~(11)~~.

~~7~~8. The sensor of any one of claims 1 to ~~6~~5, wherein the first plate ~~(11)~~ comprises an elongate strip.

~~8~~7. The sensor ~~(10)~~ of any one of claims 1 to ~~7~~6, wherein the second plate ~~(12)~~ comprises a pair of elongate strips, each elongate strip of the pair of elongate strips being one of the first portion ~~(14)~~ or the second portion ~~(15)~~ of the second plate ~~(12)~~.

~~9. [Cancelled].~~

~~10~~8. The sensor ~~(10)~~ of any one of claims 1 to ~~9~~7, wherein an intermediate layer ~~(20)~~ is provided between the first plate ~~(11)~~ and the second plate ~~(12)~~.

~~11~~9. The sensor ~~(10)~~ of claim ~~10~~8, wherein the intermediate layer ~~(20)~~ is a substrate to which the first plate ~~(11)~~ and second plate ~~(12)~~ are attached.

~~12~~10. The sensor of claim ~~2~~1, wherein the intermediate dielectric layer ~~(20)~~ is a substrate to which the first plate and second plate are attached and wherein the intermediate dielectric layer extends past an edge of the first plate and/or the second plate to provide for a mounting surface, wherein the measurement means are provided on the mounting surface.

~~13~~11. The sensor of claim ~~2~~1, wherein the measurement means are configured to charge a capacitor formed by the first and the second plate and the intermediate dielectric layer, to actively discharge said capacitor, and to measure an electric signal, preferably a voltage, between the first and the second plate after said actively discharging.

~~14~~12. The sensor ~~(10)~~ of any one of claims ~~10~~ 8 to ~~13~~11, wherein the intermediate layer ~~(20)~~ is less than 25mm in thickness, or between about 0.05 and 25mm in thickness, or between about 0.02mm and 2.5mm in thickness.

~~15~~13. The sensor ~~(10)~~ of any one of claims 1 to ~~19~~12, wherein the sensor ~~(10)~~ has a protective layer ~~(23)~~.

~~16~~14. The sensor ~~(10)~~ of any one of claims 1 to ~~15~~13, wherein the attachment portion ~~(24)~~ allows for connection and disconnection of the sensor ~~(10)~~ to the article ~~(28)~~.

~~17~~15. The sensor ~~(10)~~ of any one of claims 1 to ~~16~~13, wherein the sensor ~~(10)~~ is integrally formed with the article ~~(28)~~.

~~18~~16. The sensor ~~(10)~~ of any one of claims 1 to ~~17~~15, wherein the sensor ~~(10)~~ comprises a least one isolation layer ~~(25)~~.

~~19~~17. The sensor ~~(10)~~ of claim ~~18~~16, wherein the isolation layer ~~(25)~~ being located on a side (optionally a second side ~~(22)~~) of the sensor ~~(10)~~ configured to be located away from the article ~~(28)~~ in use.

~~20~~18. The sensor ~~(10)~~ of any one of claims 1 to ~~19~~17, wherein the article ~~(28)~~ is one or more of:

a nappy

dressing (for example a wound dressing)

bedding

clothing

a cover or container

an object or material which is configured to take on or absorb moisture

an object or material which is configured to dry over time (for example concrete, or wood).

~~21~~19. A system ~~(9)~~ for detecting or sensing moisture or wetness of an article ~~(28)~~ to which the system ~~(9)~~ is attached, the system ~~(9)~~ comprising:

a controller or processor,

a sensor ~~(10)~~, the sensor ~~(10)~~ being configured to store an electrical charge, and wherein the electrical charge storing capacity of the sensor ~~(10)~~ is based on the moisture or wetness of the article ~~(28)~~,

wherein the controller ~~(33)~~ is configured to:

charge the sensor for a first period of time ~~(50)~~, and after the first period of time ~~(50)~~ partially discharge the sensor ~~(10)~~ for a second period of time ~~(51)~~, and subsequently measure an output of the sensor ~~(10)~~, optionally at a predetermined time,

wherein the controller ~~(33)~~ is configured to determine an output of the sensor ~~(10)~~ indicative of the moisture or wetness of the article ~~(28)~~ based on the measured output of the sensor ~~(10)~~.

~~22~~20. The system of the previous claim, wherein the controller is configured to after the first period of time actively at least partially discharge the sensor for a second period of time.

~~23~~21. The system of the previous claim, wherein the sensor comprise a first and a second plate separated by a dielectric layer ~~(20)~~, and wherein the controller is configured to after the first period of time actively at least partially discharge the sensor by connecting the first and the second plate to substantially the same potential.

~~24~~22. The system ~~(9)~~ of claim ~~21~~19, wherein the sensor ~~(10)~~ comprises one or more plates and optionally the plates are electrically conductive.

~~25~~23. The system ~~(9)~~ as claimed in any one of claims ~~21~~ 19 to ~~24~~22, wherein the sensor ~~(10)~~ is the sensor ~~(10)~~ of any one of claims 1 to ~~20~~18.

~~26~~24. The system ~~(9)~~ of any one of claims ~~21~~ 19 to ~~25~~23, wherein the sensor ~~(10)~~ is charged by providing or applying a voltage or potential difference across a or the first plate ~~(11)~~ and a or the second plate ~~(12)~~.

~~27~~25. The system ~~(9)~~ of claim any one of claims ~~21~~ 19 to ~~26~~24, wherein the sensor ~~(10)~~ is charged with a constant voltage.

~~28~~26. The system ~~(9)~~ of claim any one of claims ~~21~~ 19 to ~~27~~25, wherein the first period of time ~~(50)~~ is about 30 µs.

~~29~~27. The system ~~(9)~~ of claim any one of claims ~~21~~ 19 to ~~28~~26, wherein the first period of time ~~(50)~~ is about 20 µs, or about 10 µs, or about 5 µs, or about 2 µs.

~~30~~28. The system ~~(9)~~ of claim any one of claims ~~21~~ 19 to ~~29~~27, wherein the second period of time ~~(51)~~ is about 7 µs.

~~31~~29. The system ~~(9)~~ of claim any one of claims ~~21~~ 19 to ~~30~~28, wherein the sensor ~~(10)~~ is discharged through a known resistance.

~~32~~30. The system ~~(9)~~ of claim any one of claims ~~21~~ 19 to ~~31~~29, wherein the output of the sensor ~~(10)~~ is measured by an analog to digital converter (optionally via a voltage divider circuit).

~~33~~31. The system ~~(9)~~ of claim any one of claims ~~21~~ 19 to ~~32~~30, wherein the system ~~(9)~~ comprises at least one memory element ~~(34)~~.

~~34~~32. The system ~~(9)~~ of claim any one of claims ~~21~~ 19 to ~~33~~31, wherein the system ~~(9)~~ comprises one or more switches configured to be controlled by said processor ~~(33)~~ to charge and/or discharge the sensor ~~(10)~~ (optionally the switches are one or more transistors).

~~35~~33. The system ~~(9)~~ of claim any one of claims ~~21~~ 19 to ~~34~~32, wherein the output indicative of the moisture or wetness of the article ~~(28)~~ is further based on an initial base-line measurement.

~~36~~34. The system ~~(9)~~ of claim any one of claims ~~21~~ 19 to ~~35~~33, wherein the output indicative of the moisture or wetness of the article ~~(28)~~ is based on a comparison between a first derivative of the output of the sensor ~~(10)~~ and/or optionally a second derivative of the output of the sensor ~~(10)~~.

~~37~~35. A processor ~~(33)~~ implemented method for detecting or sensing moisture or wetness of an article ~~(28)~~, the method comprising:

charging a sensor ~~(10)~~ for a first period of time ~~(50)~~, and after the first period of time ~~(50)~~,

partially discharging the sensor ~~10~~ for a second period of time ~~(51)~~, and subsequently measuring an output of the sensor ~~(10)~~ optionally at a predetermined time, and

determining an output indicative of the moisture or wetness of the article ~~(28)~~ based on the measured output of the sensor ~~(10)~~.

~~38~~36. The method of claim ~~37~~35, wherein the sensor ~~(10)~~ comprises one or more plates (optionally the plates are electrically conductive).

~~39~~37. The method of claim ~~37~~35, or claim ~~38~~ 36 wherein the sensor ~~(10)~~ is the sensor ~~(10)~~ of any one of claims 1 to ~~20~~18.

~~40~~38. The method of claim any one of claims ~~37~~ 35 to ~~39~~37, wherein the sensor ~~(10)~~ is charged by providing apply a voltage or potential difference across the sensor ~~(10)~~.

~~41~~39. The method of claim any one of claims ~~37~~ 35 to ~~40~~38, wherein the sensor ~~(10)~~ is charged by providing a voltage or potential difference across a or the first plate ~~(11)~~ and a or the second plate ~~(12)~~.

~~42~~40. The method of claim any one of claims ~~37~~ 35 to ~~41~~39, wherein the sensor ~~(10)~~ is charged with a constant voltage.

~~43~~41. The method of claim any one of claims ~~37~~ 35 to ~~42~~40, wherein the first period of time ~~(50)~~ is about 30 µs.

~~44~~42. The method of claim any one of claims ~~37~~ 35 to ~~43~~41, wherein the first period of time ~~(50)~~ is about 20 µs, or about 10 µs, or about 5 µs, or about 2 µs.

~~45~~43. The method of claim any one of claims ~~37~~ 35 to ~~44~~42, wherein the second period of time ~~(51)~~ is about 7 µs.

~~46~~44. The method of claim any one of claims ~~37~~ 35 to ~~45~~43, wherein the sensor ~~(10)~~ is discharged through a known resistance.

~~47~~45. The method of claim any one of claims ~~37~~ 35 to ~~46~~44, wherein the output of the sensor ~~(10)~~ is measured via an analog to digital converter (optionally via a voltage divider circuit).

~~48~~46. The method of claim any one of claims ~~37~~ 35 to ~~47~~45, wherein the processor ~~(33)~~ is interfaced and/or connected to at least one memory element ~~(34)~~.

~~49~~47. The method of claim any one of claims ~~37~~ 35 to ~~48~~46, wherein one or more switches are configured to be controlled by said processor ~~(33)~~ to charge and/or discharge the sensor ~~(10)~~ (optionally the switches are one or more transistors).

~~50~~48. The method of claim any one of claims ~~37~~ 35 to ~~49~~47, wherein the output indicative of the moisture or wetness of the article ~~(28)~~ is further based on an initial base-line measurement.

~~51~~49. The system of claim any one of claims ~~37~~ 35 to ~~50~~48, wherein the output indicative of the moisture or wetness of the article ~~(28)~~ is based on a comparison between a first derivative of the output of the sensor ~~(10)~~ and/or a second derivate of the output of the sensor ~~(10)~~.

~~52~~50. The system of the previous claim, wherein an event signal is generated in response to the first derivative and/or second derivate satisfying a predetermined threshold.

~~53~~51. A processor implemented method for determining the moisture or wetness of an article ~~(28)~~, the method comprising:

receiving a series of measurement readings from a sensor ~~(10)~~ indicative of the moisture or wetness of the article ~~(28)~~,

calculating the first derivative of the difference between consecutive measurement readings,

optionally calculating the second derivative of the difference between consecutive first derivative calculations, and

comparing the first derivative calculation and the second derivative calculation.

~~54~~52. The method of claim ~~53~~51, wherein the receiving of a series of measurement readings from a sensor ~~(10)~~ indicative of the moisture or wetness of the article ~~(28)~~ comprises the method of any one of claims ~~37~~ 35 to ~~40~~38.

~~55~~53. The method of claim ~~53~~ 51 or claim ~~54~~52, wherein the series of measurement readings from the sensor ~~(10)~~ indicative of the moisture or wetness of the article ~~(28)~~ is the output indicative of the moisture or wetness of the article ~~(28)~~ based on the measured output of the sensor ~~(10)~~ of any one of claims ~~37~~ 35 to ~~40~~38.

~~56~~54. The method of any one of claims ~~53~~ 51 to ~~55~~53, wherein the sensor is the sensor ~~(10)~~ of any one of claims 1 to ~~20~~18.

~~57~~55. The method of any one of claims ~~53~~ 51 to ~~56~~54, wherein the method is performed by the system ~~(9)~~ of any one of claims ~~21~~ 19 to ~~35~~33.

~~58~~56. The method of any one of claims ~~53~~ 51 to ~~57~~55, wherein the first derivative calculation is further compared to at least a previous first derivative calculation.

~~59~~57. The method of any one of claims ~~53~~ 51 to ~~58~~56, wherein the second derivative calculation is further compared to at least a previous second derivative calculation.

~~60~~58. The method of any one of claims ~~53~~ 51 to ~~59~~57, wherein no first derivative peak and no second derivative peak indicates that the moisture or wetness of the article ~~(28)~~ as measured by the sensor ~~(10)~~ is constant or unchanging.

~~61~~59. The method of any one of claims ~~53~~ 51 to ~~60~~58, wherein a small first derivative peak and no or almost no second derivative peak indicates that the sensor ~~(10)~~ has been attached to an article ~~(28)~~.

~~62~~60. The method of any one of claims ~~53~~ 51 to ~~61~~59, wherein a large negative first derivative peak and a second derivative peak going from a positive value to a negative value indicates that the sensor has been removed from an article ~~(28)~~ having a high level of moisture or wetness.

~~63~~61. The method of any one of claims ~~53~~ 51 to ~~62~~60, wherein a positive first derivative peak and second derivative peak going from a negative value to a positive value indicates that the moisture or wetness of the article ~~(28)~~ as measured by the sensor ~~(10)~~ is increasing.

~~64~~62. The method of any one of claims ~~53~~ 51 to ~~63~~61, wherein a slight positive first derivative peak and a second derivative peak going from a negative value to a positive value indicates that the article is approaching saturation point.

~~65~~63. The method of any one of claims ~~53~~ 51 to ~~64~~62, wherein a decreasing first derivative peak and a decreasing second derivative peak following an indication of an increase in moisture or wetness of the article ~~(28)~~ indicates that the article has reached saturation point.

~~66~~64. The method of any one of claims ~~53~~ 51 to ~~65~~63, wherein the measurement is automatically performed, for example according to a predetermined period, and/or wherein the measurement is performed upon receipt of a trigger, for example upon request of a user, or upon on a sensed signal.