the signal has, the more easily the doctor can discern between pathologies and the more reliability can be given in a diagnosis of the patient.

ECG signals recorded with smart clothes in case of high level activity show disturbances as intermittent loss of signals from electrodes.

Nothing in the art suggests that a sensor with a conductive layer comprising a plurality of orifices filled with silicone rubber could confer excellent fixation and flexibility properties.

Therefore, an aspect of the present invention relates to a sensor 1 to be placed in contact with the skin 12 of an user for acquiring physiological signals which comprises: a) a conductive layer 2 comprising at least conductive fibers to be placed in contact with the skin 12 for receiving physiological signals;
b) an electrical connector 5 connected to the conductive layer 2;
characterized in that the conductive layer 2 comprises a plurality of orificies 6 filled with an silicone rubber throughout the conductive area; wherein the conductive layer (2) comprises at least an electrode (3) and a track (4); the electrical connector (5) being connected to the track (4).

The sensor 1 is capable to detecting electrical physiological signals of the user.

Another aspect of the invention relates to a device comprising at least one sensor 1 of the invention and an electronic instrument 14 for receiving and collecting and/or storing and/or processing, and/or transmitting data from said sensor 1.

The present invention provides a sensor 1 adapted to be integrated in a garment 7 so as to be placed in contact with skin 12 of a user during the use of the garment 7. Therefore, another aspect of the invention relates to a garment 7 comprising at least the device of the invention.

Also, it is provided a preparation process of the sensor 1, which comprises the steps of:
a) die cutting a conductive layer of conductive fabric;

b) adding a hot melt adhesive on one surface of the conductive layer;
c) screen printing with an anti-slip silicone rubber on the the orifices 6 ~~or grooves 11~~ of the electrode 3; and
d) curing the silicone;
wherein the step a), b) can be carried out in any order.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1A illustrates an orifices 6 pattern in the electrode 3. FIG. 1B illustrates a grooves 11 pattern in the electrode 3. FIG. 1C illustrates an orifices 6 pattern in the electrode 3 with silicone rubber pattern on the surface of the electrode 3. FIG. 1D illustrates a front view of a conductive fabric with the orifices 6 filled with silicone rubber.

FIG. 2 illustrates an exploited perspective view of an embodiment of a sensor 1 according to the present invention.

FIG. 3A illustrates a cross-section of an embodiment of a sensor 1 according to the present invention. FIG. 3 B illustrates a cross-section of an embodiment of a sensor 1 according to the present invention.

FIG. 4 illustrates an elevation view of the garment 7 according to an embodiment of the present invention.

FIG. 5 illustrates a cross-section elevation view of a connection between an embodiment of a sensor 1 according to the present invention and an electronic instrument 14.

FIG.6 shows the Amplitude RS (A(v)) in resting (A), stand (B), stand/sit (C), bend (D), arms (E), walk (F), and all the activities, resting, stand stand/sit, bend arms and walk (G) for Zephyr™ HxM strap (I), Polar TEAM$^2$ strap (II), Numetrex® Cardio-Shirt (III) and the shirt of the invention (IV).

FIG. 7 shows RMS/Amplitude RS in resting (A), stand (B), stand/sit (C), bend (D), arms (E), walk (F), and all the activities, resting, stand stand/sit, bend

8. The sensor (1) according to any of the claims 1-7, wherein the silicone rubber is located only in the plurality of orifices (6).

9. A device comprising:
(a) at least one sensor (1) as defined in any of the claims 1-8,
(b) an electronic instrument (14) for receiving and collecting and/or storing and/or processing, and/or transmitting data from said sensor.

10. A garment (7) comprising the device of claim 9.

11. The garment (7) according to claim 10, wherein the portion of the garment which is coupled to the sensor is designed for applying a pressure equal or higher than 2 KPa.

12. The garment (7) according to any of the claims 10-11, wherein the garment comprises two layers, an inner and an outer layer (13), and the outer layer (13) is able to compress the sensor to the body with at least 2KPa

13. The garment (7) accoding to claim 12 wherein the outer layer (13) comprises a system to regulate the presure.

14. A process for the preparation of a sensor (1) as defined in any of the claims 1-8, which comprises the steps of:
a) die cutting a conductive layer of conductive fabric;
b) adding a hot melt adhesive on one surface of the conductive layer ;
c) screen printing with an anti-slip silicone rubber the orificies ~~or grooves~~ of the electrode (3); and
d) curing the silicone;
wherein the step a), b) can be carried out in any order.