alcohol (PVA) is formed by an electrospinning method, and gold is vapor-deposited thereon to form an electrode layer, thereby providing sufficiently high surface followability, stretchability in a lateral direction, permeabilities of gas and water, and transparency (for example, Non-patent Document 1).

[0005]

Non-patent Document 1: Akihito Miyamoto et.al., Nature Nanotechnology 12, 907 (2017)

[0006]

However, when the electro-functional member of the above-described prior art is directly attached to the skin to be used, there is a room for improving the durability because of breaking of the electrode layer due to rubbing, easily peeling off from the skin in a case of wetting with water, and the like.

[0007]

Therefore, the inventors involved in this application have been dedicated to the examination and found that the durability is improved with a fiber network configured to include two types of resins mutually different in solubility to water.

[0008]

This invention is made in consideration of the above-described point, and an object of this invention is to provide an electro-functional member improved in durability.

SUMMARY

[0009]

To achieve the above-described object, in a first aspect, the present disclosure provides an electro-functional member comprises a fiber network and a conductive member. The fiber network is configured to include a resin. The fiber network is partially solved in water and partially remains when immersed in water. The conductive member is formed on the fiber network. Here, the resin is, for example, a polyvinyl alcohol derivative.

[0010]

According to an embodiment of the electro-functional member of the invention, the fiber network includes a first resin and a second resin as the resin, and the first resin and the second resin are mutually different in solubility to water. In a preferred embodiment, the fiber network is configured by stacking a first fiber network including a fiber containing the first resin and a second fiber network including a fiber containing the second resin. In another preferred embodiment, the fiber network includes a fiber containing the first resin and a fiber containing the second resin. In further another preferred embodiment, the fiber network includes a fiber containing the first resin and the second resin.

[0011]

In the electro-functional member of the invention, an occupancy of the fiber in the fiber network is preferably 20% to 90%, and more preferably the occupancy is 30% to 70%.

[0012]

In a second aspect, the present disclosure provides a method for manufacturing an electro-functional member, the method comprises: a step of forming a first fiber network that includes a fiber containing a water-soluble first resin; a step of forming a

second fiber network that includes a fiber containing a second resin that is water-soluble and changes to being

poorly water-soluble after heating and pressure bonding; a step of changing the second resin to being poorly water-soluble by heating and pressure bonding the second fiber network; and a step of stacking the first fiber network, the second fiber network, and a conductive member.

[0013]

According to another embodiment of the method for manufacturing an electro-functional member of the invention, the method includes: a step of forming a fiber network that includes a fiber containing a first resin and a fiber containing a second resin, the first resin being water-soluble and remaining water-soluble after heating and pressure bonding, and the second resin being water-soluble and changing to being poorly water-soluble after the heating and the pressure bonding; a step of heating and pressure bonding the fiber network; and a step of disposing a conductive member on the fiber network.

[0014]

In a third aspect, the present disclosure provides a method for manufacturing an electro-functional member, the method includes: a step of forming a fiber network that includes a fiber containing a first resin and a second resin, the first resin being water-soluble and remaining water-soluble after heating and pressure bonding, and the second resin being water-soluble and changing to being poorly water-soluble after the heating and the pressure bonding; and a step of heating and pressure bonding the fiber network and further disposing a conductive member on the fiber network.

[0014a]

In a fourth aspect, the present disclosure provides a method for manufacturing an electro-functional member, comprising: a step of forming a fiber network that includes a fiber containing a first resin and a second resin, the first resin being water-

soluble and remaining water-soluble after heating and pressure bonding, and the second resin being water-soluble and changing to being poorly water-soluble after the heating and the pressure bonding; and a step of heating and pressure bonding the fiber network and further disposing a conductive member on the fiber network.

[0014b]

In a fifth aspect, the present disclosure provides a method for manufacturing an electro-functional member, comprising: a step of forming a first fiber network that includes a fiber containing a water-soluble first resin; a step of forming a second fiber network that includes a fiber containing a water-insoluble second resin; and a step of stacking the first fiber network, the second fiber network, and a conductive member.

[0014c]

In a sixth aspect, the present disclosure provides a method for manufacturing an electro-functional member, comprising: a step of forming a fiber network by disposing a water-insoluble second resin on a surface of a fiber that includes a water-soluble first resin; and a step of stacking a conductive member on the fiber network.

[0014d]

In a seventh aspect, the present disclosure provides a biometric sensor comprising: one or a plurality of nanomesh electrodes; a measurement module; an air permeable electrode disposed between the measurement module and the nanomesh electrode; and an air permeable member, wherein the nanomesh electrode, the air permeable electrode, and the air permeable member are disposed in an identical side with respect to the measurement module, the nanomesh electrode and the air permeable member are attached to contact a measurement target, and the nanomesh electrode is the electro-functional member according to the first aspect.

[0015]

According to the electro-functional member of this invention, with the