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POLARIZER AND DISPLAY DEVICE

Abstract

A polarizer and a display device are provided. The polarizer includes a linear polarization layer, a first hydrophobic layer disposed on a first surface of the linear polarization layer, and a first protection layer disposed on a surface of the first hydrophobic layer away from the linear polarization layer. This application utilizes a hydrophobic property of the first hydrophobic layer to prevent human sweat from penetrating into an interior of the polarizer and reaching the surface of the linear polarization layer, thereby preventing the sweat from corroding the linear polarization layer.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATION [0001] This application is a continuation application of U.S. application Ser. No. 17/623,009, filed on Dec. 27, 2021, which is a US national phase application based upon an International Application No. PCT/CN2021/139108, filed on Dec. 17, 2021, which claims priority to Chinese Patent Application No. 202111502707.9 filed on Dec. 10, 2021. The entire disclosures of the above applications are incorporated herein by reference.

FIELD OF DISCLOSURE
[0002] The present disclosure relates to the field of display technologies, in particular to a polarizer and a display device.
BACKGROUND
[0003] With the widespread use of organic light-emitting diode (OLED) display phones in the world, different regions have different requirements for the reliability of the OLED displays. For example, in the Indian market, due to a hot climate throughout India, customers using mobile phones in this environment will have problems with sweat corroding the OLED display. Therefore, OLED displays need to have a certain degree of resistance to sweat corrosion. The sweat is mainly divided into acid sweat and alkaline sweat. The alkaline sweat will cause discoloration of a polarizer in the OLED display, which in turn causes the phone to have a poor appearance. The acid sweat will not cause this problem.
SUMMARY OF DISCLOSURE
[0004] Current polarizers in displays have a technical problem of poor sweat corrosion resistance.
[0005] The present disclosure provides a polarizer and a display device, which are used to solve the technical problem of poor sweat corrosion resistance of a polarizer in a current display screen.
[0006] The present disclosure provides a polarizer, including: [0007] a linear polarization layer;
[0008] a first hydrophobic layer disposed on a first surface of the linear polarization layer; and
[0009] a first protection layer disposed on a surface of the first hydrophobic layer away from the linear polarization layer.
[0010] In the polarizer of the present disclosure, the polarizer further includes a second hydrophobic layer and a second protection layer.
[0011] The second hydrophobic layer is disposed on a second surface of the linear polarization layer, and the first surface is opposite to the second surface.
[0012] The second protection layer disposed on a surface of the second hydrophobic layer away from the linear polarization layer.
[0013] In the polarizer of the present disclosure, the first hydrophobic layer completely covers the first surface of the linear polarization layer.
[0014] In the polarizer of the present disclosure, the second hydrophobic layer completely covers the second surface of the linear polarization layer.
[0015] In the polarizer of the present disclosure, the first hydrophobic layer is connected to the

second hydrophobic layer on at least one side surface of the linear polarization layer.
[0016] In the polarizer of the present disclosure, the first hydrophobic layer and the second hydrophobic layer coat the linear polarization layer.
[0017] In the polarizer of the present disclosure, the first hydrophobic layer includes a flexible adhesive.
[0018] In the polarizer of the present disclosure, the first hydrophobic layer includes an organosilicone pressure sensitive adhesive, and the first protection layer is adhered to the linear polarization layer through the first hydrophobic layer.
[0019] In the polarizer of the present disclosure, the second hydrophobic layer includes a flexible adhesive.
[0020] In the polarizer of the present disclosure, the second hydrophobic layer includes an organosilicone pressure sensitive adhesive, and the second protection layer is adhered to the linear polarization layer through the second hydrophobic layer.
[0021] In the polarizer of the present disclosure, the polarizer further includes: a first adhesive layer disposed on a side of the linear polarization layer away from the first hydrophobic layer; a compensation layer disposed on a surface of the first adhesive layer away from the linear polarization layer; and a second adhesive layer dispose on a surface of the compensation layer away from the first adhesive layer.
[0022] In the polarizer of the present disclosure, the polarizer further includes: a first adhesive layer disposed on a surface of the second protection layer away from the second hydrophobic layer; a compensation layer disposed on a surface of the first adhesive layer away from the second protection layer; and a second adhesive layer disposed on a surface the compensation layer away from the first adhesive layer.
[0023] In the polarizer of the present disclosure, the linear polarization layer includes I_3^- complex and I_5^- complex.
[0024] In the polarizer of the present disclosure, material of the linear polarization layer includes polyvinyl alcohol.
[0025] In the polarizer of the present disclosure, material of the first protection layer includes tri-acetyl cellulose.
[0026] The present disclosure also provides a display device, including a display panel and a polarizer disposed on a light-emitting side of the display panel, wherein the polarizer includes:
[0027] a linear polarization layer; [0028] a first hydrophobic layer disposed on a first surface of the linear polarization layer; and [0029] a first protection layer disposed on a surface of the first hydrophobic layer away from the linear polarization layer.
[0030] In the display device of the present disclosure, the polarizer further includes a second hydrophobic layer and a second protection layer.
[0031] The second hydrophobic layer is disposed on a second surface of the linear polarization layer, and the first surface is opposite to the second surface.
[0032] The second protection layer disposed on a surface of the second hydrophobic layer away from the linear polarization layer.
[0033] In the display device of the present disclosure, the first hydrophobic layer completely covers the first surface of the linear polarization layer, and the second hydrophobic layer completely covers the second surface of the linear polarization layer.
[0034] In the display device of the present disclosure, the first hydrophobic layer and the second hydrophobic layer coat the linear polarization layer.
[0035] The present disclosure also provides a polarizer, including: [0036] a linear polarization layer; [0037] a first hydrophobic layer disposed on a first surface of the linear polarization layer;
[0038] a first protection layer disposed on a surface of the first hydrophobic layer away from the linear polarization layer. [0039] a second hydrophobic layer disposed a second surface of the linear polarization layer, wherein the first surface is opposite to the second surface; and [0040] a second

protection layer disposed on a surface of the second hydrophobic layer away from the linear polarization layer.
[0041] The first hydrophobic layer includes an organosilicone pressure sensitive adhesive, and the second hydrophobic layer includes an organosilicone pressure sensitive adhesive.
[0042] The present disclosure provides the polarizer and the display device. The polarizer includes the linear polarization layer, the first hydrophobic layer disposed on the first surface of the linear polarization layer, and the first protection layer disposed on the surface of the first hydrophobic layer away from the linear polarization layer. In the present disclosure, the first hydrophobic layer is disposed on the surface of the linear polarization layer. A hydrophobic property of the first hydrophobic layer is utilized to prevent human sweat from penetrating into an interior of the polarizer and reaching the surface of the linear polarization layer, thereby preventing the sweat from corroding the linear polarization layer, improving an ability of the polarizer to resist sweat corrosion, and improve its reliability in use.

Description

BRIEF DESCRIPTION OF DRAWINGS
[0043] In order to explain technical solutions of embodiments or the prior art more clearly, the following will briefly introduce the drawings that need to be used in the description of the embodiments or the prior art. Apparently, the drawings in the following description are only for application. For some embodiments, those of ordinary skill in the art can obtain other drawings based on these drawings without creative efforts.
[0044] FIG. **1** is a schematic structural diagram of a first polarizer of an embodiment of the present disclosure.
[0045] FIG. **2** is a schematic structural diagram of a second polarizer of an embodiment of the present disclosure.
[0046] FIG. **3** is a schematic structural diagram of a third polarizer of the present disclosure from a first perspective.
[0047] FIG. **4** is a schematic structural diagram of the third polarizer of the present disclosure from a second perspective.
[0048] FIG. **5** is a schematic structural diagram of a fourth polarizer of an embodiment of the present disclosure.
[0049] FIG. **6** is a schematic structural diagram of a fifth polarizer of an embodiment of the present disclosure.
[0050] FIG. **7** is a schematic structural diagram of a display device of an embodiment of the present disclosure.
DETAILED DESCRIPTION
[0051] The description of the following embodiments refers to the accompanying drawings to illustrate specific embodiments that can be implemented by the present disclosure. The directional terms mentioned in the present disclosure, such as top, bottom, front, back, left, [right], inside, outside, side, etc., only refer to the direction of the accompanying drawings. Therefore, the directional terms are used to explain and understand the present disclosure, not to limit the present disclosure. In the drawings, units with similar structures are indicated by the same reference numerals.
[0052] Embodiments of the present disclosure provides a polarizer and a display device. The polarizer includes the linear polarization layer, the first hydrophobic layer disposed on the first surface of the linear polarization layer, and the first protection layer disposed on the surface of the first hydrophobic layer away from the linear polarization layer. In the present disclosure, the first hydrophobic layer is disposed on the surface of the linear polarization layer. In the embodiments of

the present disclosure, the first hydrophobic layer is disposed on the surface of the linear polarization layer. A hydrophobic property of the first hydrophobic layer is utilized to prevent human sweat from penetrating into an interior of the polarizer and reaching the surface of the linear polarization layer, thereby preventing the sweat from corroding the linear polarization layer, improving an ability of the polarizer to resist sweat corrosion, and improve its reliability in use.

[0053] Structural features and functional features of the polarizer of the embodiments of the present disclosure will be described below in conjunction with the accompanying drawings.

[0054] In one embodiment, refer to FIG. **1**, which is a schematic structural diagram of a first polarizer of the present disclosure. This embodiment provides a polarizer. The polarizer includes a linear polarization layer **10**, a first hydrophobic layer **20**, and a first protection layer **30**. The first hydrophobic layer **20** is disposed on a surface of the linear polarization layer **10**. The first protection layer **30** is disposed on a surface of the first hydrophobic layer **20** away from the linear polarization layer **10**. When in use, the linear polarization layer **10** of the polarizer is assembled and fixed with a light-emitting element. The light-emitting element may be various types of display panels. For example, an organic light emitting diode display panel, a liquid crystal display panel, etc.

[0055] The linear polarization layer **10** includes I.sub.3.sup.− complex and I.sub.5.sup.− complex. The I.sub.3.sup.− complex is used to absorb light in a wavelength range of 300 to 560 nanometers, and the I.sub.5.sup.− complex is used to absorb light in a wavelength range of 395 to 700 nanometers. The linear polarization layer **10** is formed by using the I.sub.3.sup.− complex and the I.sub.5.sup.− complex to perform dyeing and extension processing on a film-like polyvinyl alcohol resin (PVA resin), and the I.sub.3.sup.− complex and the I.sub.5.sup.− complex are absorbed in the PVA resin in an aligned state. It can be understood that because of the absorption of light by the linear polarization layer **10**, a display surface of a display device with the polarizer appears in a black state in a non-display state. Human sweat contains NH.sub.4.sup.+. NH.sub.4.sup.+ will react with the I.sub.3.sup.− complex and the I.sub.5.sup.− complex in the polarizer and cause it to fail, which will cause different degrees of discoloration on edges of the polarizer, and affect an appearance of the display device.

[0056] The first hydrophobic layer **20** is disposed on the surface of the linear polarization layer **10**, which has hydrophobic and adhesive properties. The first protection layer **30** is disposed on the surface of the first hydrophobic layer **20** away from the linear polarization layer **10**, and is adhered and fixed to the linear polarization layer **10** through the first hydrophobic layer **20**. The first protection layer **30** is used to protect the linear polarization layer **10** to prevent the linear polarization layer **10** from being worn by external forces. In this embodiment, the first hydrophobic layer **20** is disposed between the linear polarization layer **10** and the first protection layer **30**. The connection between the linear polarization layer **10** and the first protection layer **30** is realized by using the adhesion property of the first hydrophobic layer **20**. The hydrophobic property of the first hydrophobic layer **20** is used to prevent human sweat from penetrating into an interior of the polarizer. Thus, it prevents NH.sub.4.sup.+ in human sweat from reacting with the I.sub.3.sup.− complex and the I.sub.5.sup.− complex in the linear polarization layer **10** to cause the polarizer to fail. Therefore, this embodiment enhances an ability of the polarizer to resist sweat corrosion, and improves its reliability in use.

[0057] A specific principle of the failure of the polarizer caused by human sweat is as follows:

[0058] A reaction of the I.sub.5.sup.− complex absorbing long wavelength light is as follows. After absorbing long wavelength light, it generates water-soluble I.sub.2 and I.sub.3.sup.− complexes, and the I.sub.3.sup.− complex can continue to absorb short wavelength light:

I.sub.5−(absorbing long wavelength).sub..fwdarw..sup.water*I*.sub.2+1.sub.3−(absorbing short wavelength)

[0059] A reaction of the I.sub.3.sup.− complex to absorb short wavelength light is as follows. After

absorbing short wavelength light, it generates water-soluble I.sub.2 and I.sup.− complex:

I.sub.3−(absorbing short wavelength).sub..fwdarw..sup.water*I*.sub.2+*I*.sup.−(soluble in water)

[0060] NH.sub.4'.sub.0 in human sweat will directly react with the I.sub.5.sup.− complex in the linear polarization layer **10**, and a product cannot absorb long wavelength light or short wavelength light, which causes both of the I.sub.3.sup.− complex and the I.sub.5.sup.− complex to fail. A reaction formula is as follows:

NH.sub.4++*I*.sub.5−(absorbing long wavelength).fwdarw.(*NH*.sub.4)*I*.sub.5

[0061] Specifically, material of the linear polarization layer **10** is polyvinyl alcohol (PVA). Material of the first protection layer **30** is tri-acetyl cellulose (TAC) and/or COP material. Use tri-acetyl cellulose element and COP material's high strength and high wear resistance to protect polyvinyl alcohol. The tri-acetyl cellulose and COP materials with high strength and high wear resistance properties are used to protect the polyvinyl alcohol.

[0062] Furthermore, the first hydrophobic layer **20** can be made of a flexible adhesive. When the first hydrophobic layer **20** prevents sweat from corroding the linear polarization layer **10**, it uses its own adhesiveness and flexibility to increase the degree of adhesion and stability between the first protection layer **30** and the linear polarization layer **10**, and further to increase the ability of the polarizer to resist sweat corrosion.

[0063] Furthermore, the first hydrophobic layer **20** can be made of an organosilicone pressure sensitive adhesive. It can be understood that the organosilicone pressure sensitive adhesive has good flexibility, adhesion, hydrophobicity, NH.sub.4.sup.+ phobicity, and high temperature resistance. Thus, in this embodiment, the first hydrophobic layer **20** is made of the organosilicone pressure sensitive adhesive, which not only increases the adhesion and stability of the adhesion between the first protection layer **30** and the linear polarization layer **10**, but also increases sweat corrosion resistance and high temperature resistance of the polarizer. The polarizer has a higher applicability in high temperature environments and meets the needs of some high temperature areas.

[0064] In this embodiment, the first hydrophobic layer **20** can completely cover the first surface of the linear polarization layer **10** to form an effective protection for the surface. In some other embodiments, the first hydrophobic layer **20** may also cover at least one side surface of the linear polarization layer **10** adjacent to the first surface, thereby protecting the side surface of the linear polarization layer **10** and preventing sweat from corroding the linear polarization layer **10** from the side surface of the polarizer. In some other embodiments, the first hydrophobic layer **20** may also cover all side surfaces of the linear polarization layer **10** adjacent to the first surface, and cover a surface of the linear polarization layer **10** opposite to the first surface. The first hydrophobic layer **20** forms a coating structure for the linear polarization layer **10**, thereby comprehensively protecting the linear polarization layer **10**, and further improving the sweat corrosion resistance of the polarizer.

[0065] In another embodiment, refer to FIG. **2**, which is a schematic structural diagram of a second polarizer of an embodiment of the present disclosure. It can be understood that the polarizer of this embodiment has the same or similar features as the polarizer of the foregoing embodiments. The functions and effects of the related technical features in the above-mentioned embodiments are also applicable in this embodiment.

[0066] The polarizer of this embodiment includes a linear polarization layer **10**, a first hydrophobic layer **20**, a first protection layer **30**, a second hydrophobic layer **40**, and a second protection layer **50**. The first hydrophobic layer **20** is disposed on a first surface of the linear polarization layer **10**. The first protection layer **30** is disposed on a surface of the first hydrophobic layer **20** away from the linear polarization layer **10**. The second hydrophobic layer **40** is disposed on a second surface of the linear polarization layer **10**. The first surface is opposite to the second surface. The second

protection layer **50** is disposed a surface of the second hydrophobic layer **40** away from the linear polarization layer **10**. In use, one side of the first protection layer **30** or one side of the second protection layer **50** of the polarizer is combined and fixed with a light-emitting element, so as to adjust light emitted by the light-emitting element.

[0067] The linear polarization layer **10** includes I.sub.3.sup.− complex and I.sub.5.sup.− complex. The linear polarization layer **10** is formed by using the I.sub.3.sup.− complex and the I.sub.5.sup.− complex to perform dyeing and extension processing on a film-like polyvinyl alcohol resin (PVA resin), and the I.sub.3.sup.− complex and the I.sub.5.sup.− complex are absorbed in the PVA resin in an aligned state.

[0068] The first hydrophobic layer **20** and the second hydrophobic layer **40** are respectively disposed on two opposite surfaces of the linear polarization layer **10**, and both have hydrophobic and adhesive properties. The first protection layer **30** is adhered and fixed to the first surface of the linear polarization layer **10** through the first hydrophobic layer **20**. The second protection layer **50** is adhered and fixed to the second surface of the linear polarization layer **10** through the second hydrophobic layer **40**. The first protection layer **30** and the second protection layer **50** are used to protect the linear polarization layer **10** to prevent the linear polarization layer **10** from being worn by external forces. In this embodiment, the first hydrophobic layer **20** is disposed between the linear polarization layer **10** and the first protection layer **30**, and the second hydrophobic layer **40** is disposed between the linear polarization layer **10** and the second protection layer **50**. The bonding effect of the first hydrophobic layer **20** and the second hydrophobic layer **40** is used to realize the connection of the linear polarization layer **10** with the first protection layer **30** and the second protection layer **50**. The hydrophobic property of the first hydrophobic layer **20** and the second hydrophobic layer **40** prevents human sweat from penetrating into an interior of the polarizer. Thus, it is prevented that NH.sub.4.sup.+ in the human sweat reacts with the I.sub.3.sup.− complex and the I.sub.5.sup.− complex in the linear polarization layer **10** to cause the polarizer to fail. For the specific principle of the failure of the polarizer caused by human sweat, refer to the description of the above embodiments.

[0069] Specifically, material of the linear polarization layer **10** is polyvinyl alcohol (PVA). Material of the first protection layer **30** is tri-acetyl cellulose. The first hydrophobic layer **20** and the second hydrophobic layer **40** may be made of a flexible adhesive. When the first hydrophobic layer **20** and the second hydrophobic layer **40** prevent sweat from corroding the linear polarization layer **10**, they use their own adhesiveness and flexibility to increase the degree of adhesion and stability between the first protection layer **30** and the second protection layer **50** with the linear polarization layer **10**, and further to increase the ability of the polarizer to resist sweat corrosion.

[0070] Furthermore, the first hydrophobic layer **20** and the second hydrophobic layer **40** may be made of an organosilicone pressure sensitive adhesive. It can be understood that the organosilicone pressure sensitive adhesive has good flexibility, adhesion, hydrophobicity, NH.sub.4.sup.+ phobicity, and high temperature resistance. Thus, in this embodiment, the first hydrophobic layer **20** and the second hydrophobic layer **40** are made of the organosilicone pressure sensitive adhesive, which not only increases the adhesion and stability of the first protection layer **30** and the second protection layer **50** with the linear polarization layer **10**, but also increases sweat corrosion resistance and high temperature resistance of the polarizer. The polarizer has a higher applicability in high temperature environments and meets the needs of some high temperature areas.

[0071] Alternatively, refer to FIG. **3** and FIG. **4**, FIG. **3** is a schematic structural diagram of a third polarizer of the present disclosure from a first perspective, and FIG. **4** is a schematic structural diagram of the third polarizer of the present disclosure from a second perspective. The third polarizer in this embodiment has the same or similar structural features as the polarizer described in the foregoing embodiments, and the related technical features are not repeated here. Compared with the polarizer shown in FIG. **2**, the polarizer shown in FIG. **3** and FIG. **4** has at least the following different technical features.

[0072] In this embodiment, on at least one side surface of the linear polarization layer **10**, the first hydrophobic layer **20** and the second hydrophobic layer **40** are connected. Thus, the first hydrophobic layer **20** and the second hydrophobic layer **40** together coat the side surface of the linear polarization layer **10** to protect the side surface of the linear polarization layer **10** and prevent sweat from corroding the linear polarization layer **10** from the side surface of the polarizer. On the side surface of the linear polarization layer **10**, a connection position of the first hydrophobic layer **20** and the second hydrophobic layer **40** is not specifically limited. If necessary, the first hydrophobic layer **20** can be extended more to make the connection position closer to the second hydrophobic layer **40**. Alternatively, the second hydrophobic layer **40** can be extended more so that the connection position is closer to the first hydrophobic layer **20**.

[0073] Alternatively, the first hydrophobic layer **20** and the second hydrophobic layer **40** can also be connected all around the linear polarization layer **10**. Thus, the first hydrophobic layer **20** and the second hydrophobic layer **40** form a coating structure for the linear polarization layer **10**. At this time, the linear polarization layer **10** is completely arranged in an accommodating cavity formed by the first hydrophobic layer **20** and the second hydrophobic layer **40**. The overall protection of the linear polarization layer **10** is realized, and the ability of the polarizer to resist sweat corrosion is further improved.

[0074] For this embodiment, a method of connecting the first hydrophobic layer **20** and the second hydrophobic layer **40** on the side surface of the linear polarization layer **10** may be as follows. After a large-sized polarizer including the first hydrophobic layer **20** and the second hydrophobic layer **40** is formed, the polarizer is cut. The first hydrophobic layer **20** and the second hydrophobic layer **40** are both flexible adhesive layers. Thus, in the cutting process, under the cutting force, the first hydrophobic layer **20** and the second hydrophobic layer **40** form a natural connection at a cutting position to realize automatic sealing of an edge of the linear polarization layer **10**.

[0075] In another embodiment, refer to FIG. **5**, which is a schematic structural diagram of a fourth polarizer of an embodiment of the present disclosure. It can be understood that the polarizer of this embodiment has the same or similar features as the polarizer of the foregoing embodiments. The functions and effects of the related technical features in the above-mentioned embodiments are also applicable in this embodiment.

[0076] The polarizer of this embodiment includes a linear polarization layer **10**, a first hydrophobic layer **20**, a first protection layer **30**, a first adhesive layer **60**, a compensation layer **70**, and a second adhesive layer **80**. The first hydrophobic layer **20** is disposed on a first surface of the linear polarization layer **10**. The first protection layer **30** is disposed on a surface of the first hydrophobic layer **20** away from the linear polarization layer **10**. The first adhesive layer **60** is disposed on a second surface of the linear polarization layer **10**. The first surface is opposite to the second surface. The compensation layer **70** is disposed on a surface of the first adhesive layer **60** away from the linear polarization layer **10**. The second adhesive layer **80** is disposed on a surface of the compensation layer **70** away from the first adhesive layer **60**. In use, the polarizer is combined and fixed with a light-emitting element through the second adhesive layer **80**, so as to adjust light emitted by the light-emitting element.

[0077] The linear polarization layer **10** includes I.sub.3.sup.− complex, I.sub.5.sup.− complex, and polyvinyl alcohol resins (PVA resins). The first hydrophobic layer **20** is disposed on the surface of the linear polarization layer **10**, which has hydrophobic and adhesive properties. The first protection layer **30** is adhered and fixed to the first surface of the linear polarization layer **10** through the first hydrophobic layer **20**. The first protection layer **30** is used to protect the linear polarization layer **10** to prevent the linear polarization layer **10** from being worn by external forces. In this embodiment, the first hydrophobic layer **20** is disposed between the linear polarization layer **10** and the first protection layer **30**. The connection between the linear polarization layer **10** and the first protection layer **30** is realized by using the adhesion property of the first hydrophobic layer **20**. The hydrophobic property of the first hydrophobic layer **20** is used to prevent human sweat from

penetrating into an interior of the polarizer. Thus, it prevents NH.sub.4.sub.+ in human sweat from reacting with the I.sub.3.sup.− complex and the I.sub.5.sup.− complex in the linear polarization layer **10** to cause the polarizer to fail.

[0078] Material of the linear polarization layer **10** is polyvinyl alcohol (PVA). Material of the first protection layer **30** is tri-acetyl cellulose. The first hydrophobic layer **20** may be made of a flexible adhesive. When the first hydrophobic layer **20** prevents sweat from corroding the linear polarization layer **10**, it uses its own adhesiveness and flexibility to increase the degree of adhesion and stability between the first protection layer **30** and the linear polarization layer **10**, and further to increase the ability of the polarizer to resist sweat corrosion. Alternatively, the first hydrophobic layer **20** and the second hydrophobic layer **40** may both be made of an organosilicone pressure sensitive adhesive.

[0079] The first adhesive layer **60** is used to realize the connection between the linear polarization layer **10** and the compensation layer **70**. The second adhesive layer **80** is used to realize the connection between the polarizer and the external light-emitting element. The first adhesive layer **60** and the second adhesive layer **80** can both be made of acrylic glue. The compensation layer **70** may include a ¼ wavelength phase difference layer. The compensation layer **70** and the linear polarization layer **10** work together to reduce reflection.

[0080] In this embodiment, the first hydrophobic layer **20** can completely cover the first surface of the linear polarization layer **10** to form an effective protection for the surface. Furthermore, the first hydrophobic layer **20** may also cover at least one side surface of the linear polarization layer **10** adjacent to the first surface, thereby protecting the side surface of the linear polarization layer **10** and preventing sweat from corroding the linear polarization layer **10** from the side surface of the polarizer. Furthermore, the first hydrophobic layer **20** may also cover all side surfaces of the linear polarization layer **10** adjacent to the first surface, and cover a surface of the linear polarization layer **10** opposite to the first surface. The first hydrophobic layer **20** forms a coating structure for the linear polarization layer **10**, thereby comprehensively protecting the linear polarization layer **10**, and further improving the sweat corrosion resistance of the polarizer.

[0081] In another embodiment, refer to FIG. **6**, which is a schematic structural diagram of a fifth polarizer of an embodiment of the present disclosure. It can be understood that the polarizer of this embodiment has the same or similar features as the polarizer of the foregoing embodiments. The functions and effects of the related technical features in the above-mentioned embodiments are also applicable in this embodiment.

[0082] The polarizer of this embodiment includes a linear polarization layer **10**, a first hydrophobic layer **20**, a first protection layer **30**, a second hydrophobic layer **40**, a second protection layer **50**, a first adhesive layer **60**, a compensation layer **70**, and a second adhesive layer **80**. The first hydrophobic layer **20** is disposed on a first surface of the linear polarization layer **10**. The first protection layer **30** is disposed on a surface of the first hydrophobic layer **20** away from the linear polarization layer **10**. The second hydrophobic layer **40** is disposed on a second surface of the linear polarization layer **10**. The first surface is opposite to the second surface. The second protection layer **50** is disposed on a surface of the second hydrophobic layer **40** away from the linear polarization layer **10**. The first adhesive layer **60** is disposed on a surface of the second protection layer **50** away from the second hydrophobic layer **40**. The compensation layer **70** is disposed on a surface of the first adhesive layer **60** away from the second protection layer **50**. The second adhesive layer **80** is disposed on a surface of the compensation layer **70** away from the first adhesive layer **60**. In use, the polarizer is combined and fixed with a light-emitting element through the second adhesive layer **80**, so as to adjust light emitted by the light-emitting element.

[0083] The linear polarization layer **10** includes I.sub.3.sup.− complex, I.sub.5.sup.− complex, and polyvinyl alcohol resins (PVA resins). The first hydrophobic layer **20** and the second hydrophobic layer **40** are respectively disposed on the opposite surfaces of the linear polarization layer **10**, which have hydrophobic and adhesive properties. The first protection layer **30** is adhered and fixed

to the first surface of the linear polarization layer **10** through the first hydrophobic layer **20**. The second protection layer **50** is adhered and fixed to the second surface of the linear polarization layer **10** through the second hydrophobic layer **40**. The first protection layer **30** and the second protection layer **50** are used to protect the linear polarization layer **10** to prevent the linear polarization layer **10** from being worn by external forces. In this embodiment, the hydrophobic property of the first hydrophobic layer **20** and the second hydrophobic layer **40** is used to prevent human sweat from penetrating into an interior of the polarizer. Thus, it prevents NH.sub.4 in human sweat from reacting with the I.sub.3.sup.− complex and the I.sub.5.sup.− complex in the linear polarization layer **10** to cause the polarizer to fail.

[0084] Material of the linear polarization layer **10** is polyvinyl alcohol. Material of the first protection layer **30** is tri-acetyl cellulose. The first hydrophobic layer **20** and the second hydrophobic layer **40** may be made of a flexible adhesive. When the first hydrophobic layer **20** and the second hydrophobic layer **40** prevent sweat from corroding the linear polarization layer **10**, they use their own adhesiveness and flexibility to increase the degree of adhesion and stability between the first protection layer **30** and the second protection layer **50** with the linear polarization layer **10**, and further to increase the ability of the polarizer to resist sweat corrosion. Alternatively, the first hydrophobic layer **20** and the second hydrophobic layer **40** may both be made of an organosilicone pressure sensitive adhesive.

[0085] The first adhesive layer **60** is used to realize the connection between the second protection layer **50** and the compensation layer **70**. The second adhesive layer **80** is used to realize the connection between the polarizer and the external light-emitting element. The first adhesive layer **60** and the second adhesive layer **80** can both be made of acrylic glue. The compensation layer **70** may include a ¼ wavelength phase difference layer. The compensation layer **70** and the linear polarization layer **10** work together to reduce reflection.

[0086] Alternatively, on at least one side surface of the linear polarization layer **10**, the first hydrophobic layer **20** and the second hydrophobic layer **40** are connected. Thus, the first hydrophobic layer **20** and the second hydrophobic layer **40** together coat the side surface of the linear polarization layer **10** to protect the side surface of the linear polarization layer **10** and prevent sweat from corroding the linear polarization layer **10** from the side surface of the polarizer. Furthermore, the first hydrophobic layer **20** and the second hydrophobic layer **40** can also be connected all around the linear polarization layer **10**. Thus, the first hydrophobic layer **20** and the second hydrophobic layer **40** form a coating structure for the linear polarization layer **10**. The overall protection of the linear polarization layer **10** is realized, and the ability of the polarizer to resist sweat corrosion is further improved.

[0087] The following takes the polarizer structure shown in FIG. **6**, and the first hydrophobic layer **20** and the second hydrophobic layer **40** form a surrounding structure for the linear polarization layer **10** as an example to test its anti-sweat corrosion ability. Test objects are selected as an ordinary polarizer PL**1**, the polarizer PL**2** of the present disclosure, a combination M**1** of a traditional polarizer and a display module, and a combination M**2** of the polarizer and the display module of the present disclosure. The discoloration of their edges in high-temperature and high-humidity environments and in alkaline synthetic sweat is tested. A formula of the alkaline artificial sweat is: 2.5 g sodium chloride (NaCl), 2.19 g ammonium chloride (NH.sub.4Cl), 0.63 g urea, 1.88 g lactic acid, 0.32 g acetic acid, 125 ml pure water, adjusting a pH to 9.5 with sodium hydroxide. Test conditions for high temperature and high humidity environment are tested at 65 degrees Celsius and 95% humidity for 24 hours. Test conditions for the alkaline artificial sweat are tested at 55 degrees Celsius and 95% humidity for 48 hours. Test results are as follows:

TABLE-US-00001 test conditions PL1 PL2 M1 M2 high distance of edge 800 450 550 100 temperature discoloration and high (μm) humidity artificial sweat 1500 650 1000 200

[0088] In the above table, a value of the distance of edge discoloration reflects the difference of an ability to resist sweat corrosion of the polarizer. The smaller the distance of edge discoloration, the

stronger the ability to resist sweat corrosion. It can be seen that the polarizer PL**2** of the present disclosure and the combination M**2** of the polarizer and the display module of the present disclosure show better anti-edge discoloration effects in high temperature and high humidity environments and in the alkaline artificial sweat.

[0089] An embodiment of the present disclosure also provides a display device. Referring to FIG. **7**, the display device includes a display panel P**1** and a polarizing structure P**2** disposed on a light-emitting side of the display panel. The polarizing structure P**2** may be the polarizer of any of the above embodiments.

[0090] It should be noted that although the present disclosure is disclosed in specific embodiments as above, the above-mentioned embodiments are not intended to limit the present disclosure. Those of ordinary skill in the art can make various changes and modifications without departing from the spirit and scope of the present disclosure. Therefore, the protection scope of the present disclosure is subject to the scope defined by the claims.

Claims

1. A polarizer, comprising: a linear polarization layer; a second hydrophobic layer disposed on a second surface of the linear polarization layer; a second protection layer disposed on a surface of the second hydrophobic layer away from the linear polarization layer; a first adhesive layer disposed on a surface of the second protection layer away from the second hydrophobic layer; and a compensation layer disposed on a surface of the first adhesive layer away from the linear polarization layer; wherein, the compensation layer comprises a ¼ wavelength phase difference layer.

2. The polarizer according to claim 1, further comprising a first hydrophobic layer and a first protection layer; wherein the first hydrophobic layer is disposed on a first surface of the linear polarization layer, and the first surface is opposite to the second surface; and wherein the first protection layer is disposed on a surface of the first hydrophobic layer away from the linear polarization layer.

3. The polarizer according to claim 2, wherein the first hydrophobic layer completely covers the first surface of the linear polarization layer.

4. The polarizer according to claim 1, wherein the second hydrophobic layer completely covers the second surface of the linear polarization layer.

5. The polarizer according to claim 2, wherein the first hydrophobic layer is connected to the second hydrophobic layer on at least one side surface of the linear polarization layer.

6. The polarizer according to claim 2, wherein the first hydrophobic layer and the second hydrophobic layer coat the linear polarization layer.

7. The polarizer according to claim 2, wherein the first hydrophobic layer comprises a flexible adhesive.

8. The polarizer according to claim 7, wherein the first hydrophobic layer comprises an organosilicone pressure sensitive adhesive, and the first protection layer is adhered to the linear polarization layer through the first hydrophobic layer.

9. The polarizer according to claim 1, wherein the second hydrophobic layer comprises a flexible adhesive.

10. The polarizer according to claim 9, wherein the second hydrophobic layer comprises an organosilicone pressure sensitive adhesive, and the second protection layer is adhered to the linear polarization layer through the second hydrophobic layer.

11. The polarizer according to claim 1, further comprising: a second adhesive layer disposed on a surface of the compensation layer away from the first adhesive layer.

12. The polarizer according to claim 2, further comprising: a second adhesive layer disposed on a surface the compensation layer away from the first adhesive layer.

13. The polarizer according to claim 1, wherein the linear polarization layer comprises I.sub.3.sup.− complex and I.sub.5.sup.− complex, or material of the linear polarization layer comprises polyvinyl alcohol.

14. The polarizer according to claim 2, wherein material of the second protection layer comprises tri-acetyl cellulose.

15. A display device, comprising a display panel and a polarizer disposed on a light-emitting side of the display panel, wherein the polarizer comprises: a linear polarization layer; a second hydrophobic layer disposed on a second surface of the linear polarization layer; a second protection layer disposed on a surface of the second hydrophobic layer away from the linear polarization layer; a first adhesive layer disposed on a surface of the second protection layer away from the second hydrophobic layer; and a compensation layer disposed on a surface of the first adhesive layer away from the linear polarization layer; wherein, the compensation layer comprises a ¼ wavelength phase difference layer.

16. The display device according to claim 15, wherein the polarizer further comprises a first hydrophobic layer and a first protection layer; wherein the first hydrophobic layer is disposed on a first surface of the linear polarization layer, and the first surface is opposite to the second surface; and wherein the first protection layer is disposed on a surface of the first hydrophobic layer away from the linear polarization layer.

17. The display device according to claim 16, wherein the first hydrophobic layer completely covers the first surface of the linear polarization layer, and the second hydrophobic layer completely covers the second surface of the linear polarization layer.

18. The display device according to claim 16, wherein the first hydrophobic layer and the second hydrophobic layer coat the linear polarization layer.

19. The display device according to claim 15, wherein the second hydrophobic layer comprises a flexible adhesive.

20. A polarizer, comprising: a linear polarization layer; a first hydrophobic layer disposed on a first surface of the linear polarization layer; a first protection layer disposed on a surface of the first hydrophobic layer away from the linear polarization layer; a second hydrophobic layer disposed on a second surface of the linear polarization layer, wherein the first surface is opposite to the second surface; and a second protection layer disposed on a surface of the second hydrophobic layer away from the linear polarization layer; a first adhesive layer disposed on a surface of the second protection layer away from the second hydrophobic layer; a compensation layer disposed on a surface of the first adhesive layer away from the linear polarization layer; wherein the first hydrophobic layer comprises a flexible adhesive, and the second hydrophobic layer comprises a flexible adhesive; and wherein, the compensation layer comprises a ¼ wavelength phase difference layer.