

DESCRIPTION

CONDUCTIVE TAPE FOR FEEDING, METHOD FOR PRODUCING SAME,
AND METHOD FOR MANUFACTURING SOLID ELECTROLYTIC
CAPACITOR USING SAME

TECHNICAL FIELD

The present invention relates to a conductive feeder tape used for electrochemical reactions, a method for manufacturing the tape, and a method for manufacturing a solid electrolytic capacitor using the tape.

BACKGROUND ART

Fig. 6 is a sectional view of conventional conductive feeder tape 30 disclosed in Japanese Patent Laid-Open Publication No.2000-243663 and Japanese Patent Laid-Open Publications No.2000-200734. Tape 30 includes metal base foil 31 and adhesive layer 32 formed on metal base foil 31. Conductive feeder tape 30 is mainly used as a feeding electrode for forming conductive polymer by an electrochemical reaction.

A method for manufacturing a solid electrolytic capacitor by this electrochemical reaction will be described. First, an anode foil of valve metal is prepared. The anode foil having a strip shape having protrusions on both sides thereof. These protrusions are to be capacitor elements. Conductive feeder tape 30 is attached to the anode foil so as to feed the foil. The anode foil having the strip shape is then immersed in electrolyte solution to perform an electrochemical reaction in the solution, as to form a conductive polymer layer on the anode foil.

In the case that metal base foil 31 is made of material anodized in

electrolyte solution, the applying of a voltage to foil 31 in the electrolyte solution causes a chemical reaction which produces an oxide layer on a surface of metal base foil 31, accordingly preventing the foil from feeding. Metal base foil 31 made of material that corrodes in electrolyte solution cannot be used.

Metal base foil 31 is generally made of material, such as nickel or stainless steel, which is neither anodized in electrolyte solution nor corroded by a chemical reaction in electrolyte solution. However, these materials are expensive.

SUMMARY OF THE INVENTION

In accordance with a first aspect of the present invention, there is provided a conductive feeder tape comprising: a metal base foil having a first surface and a second surface opposite to the first surface, the metal base foil being made of metal that is anodized in electrolyte solution or is corroded by a chemical reaction in electrolyte solution; a metal film layer provide on the first surface of the metal base foil, the metal film layer being made of metal that is neither anodized in electrolyte solution nor corroded by a chemical reaction in electrolyte solution; and an adhesive layer over the second surface of the metal base foil, wherein the metal base foil includes a metal core foil having a first surface and a second surface opposite to the first surface of the metal core foil, a first metal coat foil provided on the first surface of the metal core foil, and a second metal coat foil provided on the second surface of the metal core foil.

In accordance with a second aspect of the present invention, there is provided a method for manufacturing a conductive feeder tape, comprising: preparing a metal base foil having a first surface and a second surface opposite to the first surface, the metal base foil being made of metal that is

anodized in electrolyte solution or corroded by a chemical reaction in electrolyte solution; forming a metal film layer on the first surface of the metal base foil, the metal film layer being made of metal that is neither anodized in electrolyte solution nor corroded by a chemical reaction in electrolyte solution; and forming an adhesive layer over the second surface of the metal base foil, wherein the metal base foil includes a metal core foil having a first surface and a second surface opposite to the first surface of the metal core foil, a first metal coat foil provided on the first surface of the metal core foil, and a second metal coat foil provided on the second surface of the metal core foil.

In accordance with a third aspect of the present invention, there is provided a method for manufacturing a solid electrolytic capacitor, comprising: preparing a conductive feeder tape which includes a metal base foil having a first surface and a second surface opposite to the first surface, the metal base foil being made of metal that is anodized in electrolyte solution or is corroded by a chemical reaction in electrolyte solution, a metal film layer provided on the first surface of the metal base foil, the metal film layer being made of metal that is neither anodized in electrolyte solution nor corroded by a chemical reaction in electrolyte solution, an adhesive layer over the second surface of the metal base foil, and a resin layer provided between the second surface of the metal base foil and the adhesive layer; separating a valve metal body into an anode portion and a cathode lead-out portion with an insulating tape between the anode portion and a cathode lead-out portion by attaching an insulating tape onto the valve metal body, the valve metal body having an anodized layer provided thereon; forming a conductive layer on the cathode lead-out portion of the valve metal body; attaching the conductive tape onto the anode portion and the insulating tape of the valve metal body; and forming a conductive polymer layer on the

conductive layer by an electrochemical reaction by applying a voltage between the conductive tape and the valve metal body while immersing the valve metal body in electrolyte solution, the valve metal body having the conductive tape and the insulating tape attached thereto.

In accordance with a fourth aspect of the present invention, there is provided a method for manufacturing a solid electrolytic capacitor, comprising: preparing a conductive feeder tape which includes a metal base foil having a first surface and a second surface opposite to the first surface, the metal base foil being made of metal that is anodized in electrolyte solution or is corroded by a chemical reaction in electrolyte solution, a metal film layer provided on the first surface of the metal base foil, the metal film layer being made of metal that is neither anodized in electrolyte solution nor corroded by a chemical reaction in electrolyte solution, and an adhesive layer over the second surface of the metal base foil, wherein the metal film layer is made of gold, platinum, silver, palladium, stainless, chromium, carbon, or alloy thereof; separating a valve metal body into an anode portion and a cathode lead-out portion with an insulating tape between the anode portion and a cathode lead-out portion by attaching an insulating tape onto the valve metal body, the valve metal body having an anodized layer provided thereon; forming a conductive layer on the cathode lead-out portion of the valve metal body; attaching the conductive tape onto the anode portion and the insulating tape of the valve metal body; and forming a conductive polymer layer on the conductive layer by an electrochemical reaction by applying a voltage between the conductive tape and the valve metal body while immersing the valve metal body in electrolyte solution, the valve metal body having the conductive tape and the insulating tape attached thereto.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a sectional view of a conductive feeder tape according to Exemplary Embodiment 1 of the present invention.

Fig. 2 is a sectional view of a conductive feeder tape according to Exemplary Embodiment 2 of the invention.

Fig. 3 is a sectional view of a conductive feeder tape according to Exemplary Embodiment 3 of the invention.

Fig. 4A is a plan view of a capacitor element array according to Exemplary Embodiment 4 of the invention.

Fig. 4B is a sectional view of the capacitor element array at line 4B-4B shown in Fig. 4A.

5 Fig. 4C is an enlarged partial sectional view of the capacitor element array shown in Fig. 4B.

Fig. 5 shows evaluation results of the solid electrolytic capacitor elements according to the embodiments.

Fig. 6 is a sectional view of a conventional conductive feeder tape.

10

REFERENCE NUMERALS

- | | |
|------|---|
| 1 | Metal Base Foil |
| 1A | Surface of Metal Base Foil (First Surface) |
| 1B | Surface of Metal Base Foil (Second Surface) |
| 15 2 | Metal Film Layer |
| 3 | Adhesive Layer |

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

EXEMPLARY EMBODIMENT 1

20 Fig. 1 is a sectional view of conductive feeder tape 101 according to Exemplary Embodiment 1 of the present invention. Conductive feeder tape 101 includes metal base foil 1 having surface 1A and surface 1B opposite to surface 1A, metal film layer 2 provided on surface 1A, and adhesive layer 3 provided on surface 1B. Metal base foil 1 is obtained by rolling aluminum
25 1085 to have a thickness of 30 μm and a width of 180 mm. Metal film layer 2 is formed by vacuum depositing nickel on surface 1A of metal base foil 1, and has a thickness of 0.1 μm . Metal base foil 1 having the width of 180

mm has metal film layer 2 and adhesive layer 3 provided on respective ones of both surfaces thereof. Foil 1 is cut with a slit to have a width of 7.5 mm, thereby providing conductive feeder tape 101. Protective tape 53 may be applied onto adhesive layer 3 before metal base foil 1 is cut. In this case, protective tape 53 is cut together with metal base foil 1 and removed when conductive feeder tape 101 is used.

Conductive feeder tape 101 can feed preferably due to metal film layer 2 made of nickel although metal base foil 1 is made of aluminum. Conductive feeder tape 101 can be manufactured inexpensively since metal base foil 1 is made of inexpensive aluminum 1085.

According to Embodiment 1, metal film layer 2 is made of nickel, but may be made of another metallic material that is neither anodized in electrolyte solution nor corroded by a chemical reaction in electrolyte solution. For example, metal film layer 2 may be made of gold, platinum, silver, palladium, stainless, chromium, carbon, or alloy thereof.

The thickness of metal film layer 2 is not limited to 0.1 μm , and may range from 0.01 μm to 10 μm . Having a thickness less than 0.01 μm , metal film layer 2 may have defects, accordingly being prevented from feeding stably. Having a thickness exceeding 10 μm , metal film layer 2 is expensive, accordingly preventing conductive feeder tape 101 from being manufactured inexpensively.

Metal film layer 2 may be formed not only by vacuum deposition but also by sputtering, ion plating, chemical deposition, cladding, plating, or printing.

In conductive feeder tape 101, adhesive layer 3 is formed after metal film layer 2 is formed. This prevents adhesive layer 3 from being altered due to heat treatment or immersion in solution which is performed when

metal film layer 2 is formed.

Metal base foil 1 is made of aluminum 1085, but may be made of metallic material, such as tantalum, niobium, or titanium, that is anodized in electrolyte solution. Metal base foil 1 may be made of metallic material, such as iron, zinc, copper, or magnesium, which is corroded by a chemical reaction in electrolyte solution.

The thickness of metal base foil 1 is not limited to 30 μm , but may be not more than 60 μm , preferably not more than 40 μm . Ends of tape 101 are exposed in the electrolyte solution. The electrochemical reaction starts on a portion of the surface of conductive feeder tape 101 in the electrolyte solution. If metal base foil 1 has a thickness exceeding 60 μm , the electrochemical reaction is performed inefficiently due to an increase of the ratio of the area of the exposed ends to the area of the portion of the surface on which the electrochemical reaction starts.

The width of metal base foil 1 is not limited to 180 mm, but may be determined as desired. Metal base foil 1 may be cut into individual pieces having desired widths, instead of a width of 7.5 mm.

EXEMPLARY EMBODIMENT 2

Fig. 2 is a sectional view of conductive feeder tape 102 according to Exemplary Embodiment 2 of the present invention. Conductive feeder tape 102 includes metal base foil 4 having surface 4A and surface 114B opposite to surface 4A, metal film layer 5 on surface 4A, resin layer 6 on surface 114B, and adhesive layer 7 on resin layer 6. Metal base foil 4 is made of aluminum 1085. Resin layer 6 is made of polyethylene terephthalate (PET).

A method for manufacturing conductive feeder tape 102 will be described below. Resin layer 6 is applied onto surface 114B of metal base

foil 4 having a width of 180 mm and a thickness of 30 μm . Next, metal film layer 5 having a thickness of 0.1 μm is formed by vacuum-depositing nickel on surface 4A of metal base foil 4. Adhesive layer 7 is formed on resin layer 6. Then, metal base foil 4 which has the width of 180 mm and which has metal film layer 5 and adhesive layer 7 on respective ones of both surfaces thereof is cut with a slitter to have a width of 7.5 mm, thereby providing conductive feeder tape 102. Protective tape 57 may be applied onto adhesive layer 7 before metal base foil 4 is cut. In this case, protective tape 57 is cut together with metal base foil 4 and removed when conductive feeder tape 102 is used.

Conductive feeder tape 102 can feed preferably due to metal film layer 5 made of nickel although metal base foil 4 is made of aluminum. Conductive feeder tape 102 can be manufactured inexpensively since metal base foil 4 and resin layer 6 are made of inexpensive aluminum 1085 and inexpensive PET, respectively.

According to Embodiment 2, metal film layer 2 is made of nickel, but may be made of another metallic material that is neither anodized in electrolyte solution nor corroded by a chemical reaction in electrolyte solution. For example, metal film layer 2 may be made of gold, platinum, silver, palladium, stainless, chromium, carbon, or alloy thereof.

The thickness of metal film layer 5 is not limited to 0.1 μm , but may range from 0.01 μm to 10 μm . Having a thickness less than 0.01 μm , metal film layer 5 may have defects, accordingly being prevented from feeding stably. Having a thickness exceeding 10 μm , metal film layer 5 is expensive, accordingly preventing conductive feeder tape 102 from being manufactured inexpensively.

Metal film layer 5 may be formed not only by vacuum deposition but

also by sputtering, ion plating, chemical deposition, cladding, plating, or printing.

In conductive feeder tape 102, adhesive layer 7 is formed after metal film layer 5 is formed. This prevents adhesive layer 7 from being altered by heat treatment or immersion in solution which is performed when metal film layer 5 is formed.

Metal base foil 4 is made of aluminum 1085, and may be made of metallic material, such as tantalum, niobium, or titanium, that is anodized in electrolyte solution. Metal base foil 4 may be made of metallic material, such as iron, zinc, copper, or magnesium, which is corroded by a chemical reaction in electrolyte solution.

The thickness of metal base foil 4 is not limited to 30 μm , but may be not more than 60 μm , preferably not more than 40 μm . Ends of tape 102 are exposed in the electrolyte solution. The electrochemical reaction starts on a portion of the surface of conductive feeder tape 102 in the electrolyte solution. If metal base foil 4 has a thickness exceeding 60 μm , the electrochemical reaction is performed inefficiently due to an increase of the ratio of the area of the exposed ends to the area of the portion of the surface on which the electrochemical reaction starts.

The width of metal base foil 4 is not limited to 180 mm, but may be determined as desired. Metal base foil 4 may be cut into individual pieces having desired widths, instead of a width of 7.5 mm.

The material of resin layer 6 is not limited to PET.

EXEMPLARY EMBODIMENT 3

Fig. 3 is a sectional view of conductive feeder tape 103 according to Exemplary Embodiment 3 of the present invention. Conductive feeder tape

103 includes metal core foil 8 having surface 8A and surface 8B opposite to surface 8A, metal coat foil 81 on surface 8A, metal coat foil 82 on surface 8B, metal film layer 10 on metal coat foil 81, and adhesive layer 11 on metal coat foil 82. Metal core foil 8 is made of aluminum 5052 having a tensile strength larger than that of aluminum 1085. Metal coat foils 81 and 82 are made of aluminum 1050. Metal core foil 8 and metal coat foils 81 and 82 provide metal base foil 180. Metal base foil 180 has surface 180A of metal coat foil 81 and has surface 180B of metal coat foil 82 opposite to surface 180A. That is, metal film layer 10 is formed on surface 180A, and adhesive layer 11 is formed on surface 180B.

A method for manufacturing conductive feeder tape 103 will be described below. Metal core foil 8 and metal coat foils 81 and 82 are bonded together and roll-formed as to provide metal base foil 180 having a width of 180 mm and a thickness of 30 μm . Metal core foil 8 has a thickness of 24 μm . Metal coat foils 81 and 82 have thicknesses of 3 μm . Next, metal film layer 10 having the thickness of 0.1 μm is formed by vacuum-depositing nickel on metal coat foil 81, that is, on surface 180A. Adhesive layer 11 is formed on metal coat foil 82, that is, on surface 180B. Then, metal base foil 180 which has the width of 180 mm and which has metal film layer 10 and adhesive layer 11 on respective ones of both surfaces thereof is cut with a slitter to have a width of 7.5 mm, thereby providing conductive feeder tape 103. Protective tape 61 may be applied onto adhesive layer 11 before metal base foil 180 is cut. In this case, protective tape 61 is cut together with metal base foil 180 and removed when conductive feeder tape 103 is used.

Conductive feeder tape 103 includes the combination of metal core foil 8 having a large tensile strength and metal coat foils 81 and 82 having a small tensile strength, thereby providing metal base foil 180 with a

large strength. Metal coat foils 81 and 82 made of the same material on both surfaces of metal core foil 8 prevents metal base foil 180 from warping. The concentration of metal impurity in metal coat foils 81 and 82 is smaller than that in metal core foil 8, thereby reducing an effect of the metal impurity on the formation of metal film layer 10 or the electrochemical reaction in the electrolyte solution.

Conductive feeder tape 103 can feed preferably due to metal film layer 10 made of nickel although metal base foil 180 is made of aluminum. Conductive feeder tape 103 can be manufactured inexpensively since metal base foil 180 is made of inexpensive aluminum.

Metal core foil 8 is made of aluminum 5052, and metal coat foils 81 and 82 are made of aluminum 1050. However, the materials of the foils are not limited to these. Metal impurity contained in each of metal coat foils 81 and 82 metal core foil 8 may affects the electrochemical reaction in the electrolyte solution. The concentration of the metal impurity in each of metal coat foils 81 and 82 is smaller than the concentration of the metal impurity in metal core foil 8.

According to Embodiment 3, metal film layer 10 is made of nickel, but may be made of another metallic material that is neither anodized in electrolyte solution nor corroded by a chemical reaction in electrolyte solution. For example, metal film layer 10 may be made of gold, platinum, silver, palladium, stainless, chromium, carbon, or alloy thereof.

The thickness of metal film layer 10 is not limited to 0.1 μm , but may range from 0.01 μm to 10 μm . Having a thickness less than 0.01 μm , metal film layer 10 may have defects, accordingly being prevented from feeding stably. Having a thickness exceeding 10 μm , metal film layer 10 is expensive, accordingly preventing conductive feeder tape 103 from being

manufactured inexpensively.

Metal film layer 10 is formed by vacuum deposition, but may be formed by sputtering, ion plating, chemical deposition, cladding, plating, or printing.

In conductive feeder tape 103, adhesive layer 11 is formed after metal
5 film layer 10 is formed. This prevents adhesive layer 11 from being altered by heat treatment or immersion in a solution which is performed when metal film layer 10 is formed.

According to Embodiment 3, the thickness (24 μm) of metal core foil 8 is eight times greater than the thickness (3 μm) of each of metal coat foils 81
10 and 82. If the thickness of metal core foil 8 is less than twice the thickness of each of metal coat foils 81 and 82, metal base foil 180 does not have a large tensile strength. Thus, metal core foil 8 preferably has a thickness at least twice greater than that of each of metal coat foils 81 and 82.

Aluminum 5052, the material of metal core foil 8, has a tensile strength
15 larger than that of aluminum 1050, the material of metal coat foils 81 and 82. However, aluminum 5052 is not only the material of metal core foil 8. Metal core foil 8 may be made of metallic material, such as tantalum, niobium, or titanium, which is anodized in electrolyte solution. Metal core foil 8 may be made of metallic material, such as iron, zinc, copper, or magnesium, which is
20 corroded by a chemical reaction in electrolyte solution.

The thickness of metal base foil 180 is not limited to 30 μm , but may be not more than 60 μm , preferably not more than 40 μm . Ends of tape 103 are exposed in the electrolyte solution. The electrochemical reaction starts on a portion of the surface of conductive feeder tape 103 in the electrolyte solution.
25 If metal base foil 180 has a thickness exceeding 60 μm , the electrochemical reaction is performed inefficiently due to an increase of the ratio of the area of the exposed ends to the area of the portion of the surface on which the

electrochemical reaction starts.

The width of metal base foil 180 is not limited to 180 mm, but may be determined as desired. Metal base foil 180 may be cut into individual pieces having desired widths, instead of a width of 7.5 mm.

EXEMPLARY EMBODIMENT 4

Fig. 4A is a plan view of capacitor element array 104 in a process of manufacturing solid electrolytic capacitor element 105 according to Exemplary Embodiment 4 of the present invention. Fig. 4B is a sectional view of the capacitor element array at line 4B-4B shown in Fig. 4A. Fig. 4C is an enlarged partial sectional view of the capacitor element array shown in Fig. 4B. Capacitor element array 104 includes anode portions 13, cathode lead-out portions 14, insulating tapes 15, valve metal body 16, conductive feeder tape 17, conductive layers 18, conductive polymer layers 19, carbon layers 20, and silver layers 21.

A method for manufacturing capacitor element array 104 including plural solid electrolytic capacitor elements 105 shown in Fig. 4A will be described below. Aluminum foil 106 having both surfaces thereof electrochemically roughened is prepared. Anodized layers are formed on both surfaces of foil 106 with an anodizing voltage of 35V. Insulating tapes 15 are applied onto both surfaces of aluminum foil 106. Aluminum foil 106 is formed into valve metal body 16 having a desired shape. Valve metal body 16 is separated into anode portions 13 and cathode lead-out portions 14 with insulating tapes 15 between portions 13 and 14. Cathode lead-out portions 14 of valve metal body 16 are coated with manganese nitrate solution applied thereto, and are then subjected to a thermal decomposition process for five minutes at 300°C, thereby providing conductive layers 18 of

manganese dioxide on cathode lead-out portions 14.

Next, conductive feeder tape 17 is attached onto insulating tapes 15. Valve metal body 16 is immersed in electrolyte solution of pH 3.5 while adhesive layer 17A of conductive feeder tape 17 is attached onto insulating
5 tapes 15. Then, a voltage is applied for 30 minutes between conductive feeder tape 17, an anode, and a stainless steel, a cathode, provided in the electrolyte solution. The electrolyte solution contains 0.2 mol/l of pyrrole and 0.1 mol/l of alkylnaphthalenesulfonate. The voltage initiates an electrochemical reaction from conductive feeder tape 17 as to form
10 conductive polymer layer 19 having a desired thickness entirely on respective both surfaces of cathode lead-out portions 14.

Next, conductive feeder tape 17 is removed from valve metal body 16. Carbon layer 20 is applied onto conductive polymer layer 19. Silver layer 21 is applied onto carbon layer 20. Then, the plurality of solid electrolytic
15 capacitor elements 105 are divided into individual solid electrolytic capacitor elements 105. A cathode lead and an anode lead are taken out from cathode lead-out portion 14 and anode portion 13 of each capacitor element 105, respectively. Each capacitor element 105 is coated with epoxy resin, thus providing a solid electrolytic capacitor.

20 The pH value of the electrolyte solution is not more than 4. Conductive polymer layer 19 is made of pyrrole, but may be made of thiophene, furan, or a derivative thereof.

Conductive layer 18 is made of manganese dioxide, but may be made of other metal oxide or conductive polymer.

25 Valve metal body 16 is made of aluminum, but may be made of other valve metals, such as tantalum, niobium, or titanium.

Examples of solid electrolytic capacitor element 105 according to

Embodiment 4 will be described below.

EXAMPLE 1

A solid electrolytic capacitor was manufactured using conductive feeder tape 101 of Embodiment 1 as conductive feeder tape 17.

EXAMPLE 2

A solid electrolytic capacitor was manufactured using conductive feeder tape 102 of Embodiment 2 as conductive feeder tape 17.

EXAMPLE 3

A solid electrolytic capacitor was manufactured using as conductive feeder tape 103 of Embodiment 3 as conductive feeder tape 17.

COMPARATIVE EXAMPLE

A solid electrolytic capacitor was manufactured using conventional conductive feeder tape 30 including metal base foil 31 of nickel shown in Fig. 6 as conductive feeder tape 17.

Fig. 5 shows a capacitance, a tangent of loss angle, an equivalent series resistance (ESR), and an initial value of a leakage current two minutes after application of 10V of each of the solid electrolytic capacitors of Examples 1 to 3 and the comparative example.

As shown in Fig. 5, it was confirmed that each of the solid electrolytic capacitors of Examples 1 to 3 has the initial value similar to that of the conventional solid electrolytic capacitor. This indicates that conductive feeder tapes 101, 102, and 103 according to Embodiments 1 to 3 have

sufficient feeding function in electrolyte solution.

INDUSTRIAL APPLICABILITY

A conductive feeder tape according to the present invention feeds
5 reliably in electrolyte solution and is inexpensive, and is useful as a
conductive feeder tape used for an electrochemical reaction.

CLAIMS

1. A conductive feeder tape comprising:

a metal base foil having a first surface and a second surface opposite
5 to the first surface, the metal base foil being made of metal that is anodized in
electrolyte solution or is corroded by a chemical reaction in electrolyte solution;

a metal film layer provide on the first surface of the metal base foil,
the metal film layer being made of metal that is neither anodized in electrolyte
solution nor corroded by a chemical reaction in electrolyte solution; and

10 an adhesive layer over the second surface of the metal base foil,

wherein the metal base foil includes

a metal core foil having a first surface and a second
surface opposite to the first surface of the metal core foil,

a first metal coat foil provided on the first surface of the
15 metal core foil, and

a second metal coat foil provided on the second surface of
the metal core foil.

2. The conductive feeder tape of claim 1, further comprising a resin layer
20 provided between the second surface of the metal base foil and the adhesive
layer.

3. The conductive feeder tape of claim 1, wherein the metal film layer has
a thickness ranging from 0.01 μm to 10 μm .

25

4. The conductive feeder tape of claim 1, wherein the metal film layer is
made of gold, platinum, silver, palladium, nickel, stainless, chromium, carbon,
or alloy thereof.

5. The conductive feeder tape of claim 4, wherein the metal film layer is formed by vacuum deposition, sputtering, ion plating, chemical deposition, cladding, plating, or printing.

6. The conductive feeder tape of claim 1, wherein the metal base foil is made of at least one of aluminum, tantalum, niobium, and titanium.

5

7. The conductive feeder tape of claim 1, wherein the metal base foil is made of at least one of iron, zinc, copper, and magnesium.

8. The conductive feeder tape of claim 1, wherein the metal base foil has a
10 thickness not more than 60 μm .

9. The conductive feeder tape of claim 1, wherein a concentration of metal impurity contained in the metal core foil is larger than a concentration of metal impurity contained in each of the first metal coat foil and the second metal coat
15 foil, the metal impurity affecting electrochemical reaction.

10. The conductive feeder tape of claim 1, wherein the metal core layer has a thickness not less than twice greater than a thickness of each of the first metal coat foil and the second metal coat foil.

11. A method for manufacturing a conductive feeder tape, comprising:

preparing a metal base foil having a first surface and a second surface opposite to the first surface, the metal base foil being made of metal that
5 is anodized in electrolyte solution or corroded by a chemical reaction in electrolyte solution;

forming a metal film layer on the first surface of the metal base foil, the metal film layer being made of metal that is neither anodized in electrolyte solution nor corroded by a chemical reaction in electrolyte solution; and

10 forming an adhesive layer over the second surface of the metal base foil,

wherein the metal base foil includes

a metal core foil having a first surface and a second surface opposite to the first surface of the metal core foil,

15 a first metal coat foil provided on the first surface of the metal core foil, and

a second metal coat foil provided on the second surface of the metal core foil.

20 12. The method of claim 11, further comprising

attaching a protective tape onto the adhesive layer.

13. The method of claim 11, wherein said forming of the metal film layer comprises forming the metal film layer by vacuum deposition, sputtering,
25 ion plating, chemical deposition, cladding, plating, or printing.

14. A method for manufacturing a solid electrolytic capacitor, comprising:
preparing a conductive tape as defined in any one of claims 1 to 10;

separating a valve metal body into an anode portion and a cathode lead-out portion with an insulating tape between the anode portion and a cathode lead-out portion by attaching an insulating tape onto the valve metal
5 body, the valve metal body having an anodized layer provided thereon;

forming a conductive layer on the cathode lead-out portion of the valve metal body;

attaching the conductive tape onto the anode portion and the insulating tape of the valve metal body; and

10 forming a conductive polymer layer on the conductive layer by an electrochemical reaction by applying a voltage between the conductive tape and the valve metal body while immersing the valve metal body in electrolyte solution, the valve metal body having the conductive tape and the insulating tape attached thereto.

15

15. A method for manufacturing a solid electrolytic capacitor, comprising:

preparing a conductive feeder tape which includes

a metal base foil having a first surface and a second

surface opposite to the first surface, the metal base foil being made of metal that is anodized in electrolyte solution or is corroded by a chemical reaction in electrolyte solution,

5 a metal film layer provided on the first surface of the metal base foil, the metal film layer being made of metal that is neither anodized in electrolyte solution nor corroded by a chemical reaction in electrolyte solution,

 an adhesive layer over the second surface of the metal
10 base foil, and

 a resin layer provided between the second surface of the metal base foil and the adhesive layer;

 separating a valve metal body into an anode portion and a cathode lead-out portion with an insulating tape between the anode portion and a
15 cathode lead-out portion by attaching an insulating tape onto the valve metal body, the valve metal body having an anodized layer provided thereon;

 forming a conductive layer on the cathode lead-out portion of the valve metal body;

 attaching the conductive tape onto the anode portion and the
20 insulating tape of the valve metal body; and

 forming a conductive polymer layer on the conductive layer by an electrochemical reaction by applying a voltage between the conductive tape and the valve metal body while immersing the valve metal body in electrolyte solution, the valve metal body having the conductive tape and the insulating
25 tape attached thereto.

16. A method for manufacturing a solid electrolytic capacitor, comprising:

preparing a conductive feeder tape which includes

a metal base foil having a first surface and a second

5 surface opposite to the first surface, the metal base foil being made of metal that is anodized in electrolyte solution or is corroded by a chemical reaction in electrolyte solution,

a metal film layer provided on the first surface of the metal base foil, the metal film layer being made of metal that is neither
10 anodized in electrolyte solution nor corroded by a chemical reaction in electrolyte solution, and

an adhesive layer over the second surface of the metal base foil, wherein the metal film layer is made of gold, platinum, silver, palladium, stainless, chromium, carbon, or alloy thereof;

15 separating a valve metal body into an anode portion and a cathode lead-out portion with an insulating tape between the anode portion and a cathode lead-out portion by attaching an insulating tape onto the valve metal body, the valve metal body having an anodized layer provided thereon;

forming a conductive layer on the cathode lead-out portion of the
20 valve metal body;

attaching the conductive tape onto the anode portion and the insulating tape of the valve metal body; and

forming a conductive polymer layer on the conductive layer by an electrochemical reaction by applying a voltage between the conductive tape and
25 the valve metal body while immersing the valve metal body in electrolyte solution, the valve metal body having the conductive tape and the insulating tape attached thereto.