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# SELENIUM RECTIFIERS

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7 Claims. (Cl. 317—241)

My invention relates to selenium rectifiers of the kind in which an artificial or non-genetic layer is provided between the selenium and counterelectrode layers.

According to the invention, in a rectifier of the kind described the non-genetic layer consists of a saccharide or a mixture of two or more saccharides.

The term "Saccharide" means, in this specification, a water soluble monosaccharide or a water soluble substance which, upon hydrolysis, produces only one or more monosaccharides.

According to one method of putting the invention into effect an incomplete rectifier element consisting of a base plate having a layer of selenium applied to it, the selenium being in its crystalline form, is immersed for one minute in a one percent solution by weight of the monosaccharide D-glucose in water, the solution being maintained at 80° C. In order to insure uniformity of the non-genetic layer there must be added to the solution a material which wets the selenium, for example, gelatine. The plate is then removed from the solution, being arranged with its plane vertical and being withdrawn vertically at a rate of six inches per minute. The temperature at which this dipping is performed and the rate of withdrawal are so chosen that the water evaporates almost completely and the plate is dry in appearance within a few seconds of its being withdrawn from the solution. The proportion of D-glucose may be varied within limits: with a proportion of 0.5 percent the effect of the process upon the rectifier becomes seriously impaired, probably because the layer becomes too thin, and at a proportion of 4 percent the effect of increasing the proportion becomes insignificant. The proportion of the wetting agent is preferably as small as possible for the reason that the gelatine must not become a significant component of the non-genetic layer. Gelatine is preferably added in the proportion of 0.02 percent by weight of the solution.

In order to insure complete evaporation of the water the plate is preferably exposed to radiant heat for a few minutes after its withdrawal from the solution.

The rate of evaporation also depends upon the ambient temperature and the rate of air flow past the plate while it is being withdrawn from the solution. The procedure set out above has been found suitable for use in a room at a temperature of 15° C. and having a normal degree of ventilation, the resulting rectifier having a non-genetic layer of such a thickness that the forward resistance of the rectifier is of reasonable value. Variation in any of the conditions results in a change in this forward resistance, but, in practice, it has been found convenient to vary the thickness of the layer by variation in the concentration of the solution, all other conditions being maintained constant.

After the plate has dried completely the counterelectrode is applied and the element electroformed in known manner.

During the application of the D-glucose the base plate necessarily becomes covered with a film of this material,



but the film is so thin that its resistance is small and the forward resistance is not increased unduly.

Other substances which may be used in place of the D-glucose are galactose, xylose, fructose, lactose, sucrose, raffinose, maltose, starch or inulin. Alternatively, a mixture of two or more of these substances may be used.

It has been found that the substances of higher molecular weight produce very stable rectifiers in that they do not age to any significant degree. The substances of lower molecular weight, however, produce rectifiers, the reverse resistance of which decreases significantly with age. It is therefore preferable, when using mixtures, to use only a small proportion of substances of lower molecular weight. When using a mixture of glucose and sucrose, for example, the proportion of glucose to the total solute is preferably one part in four by weight.

Although I have herein described several methods of forming a non-genetic or barrier layer on the selenium layer of a rectifier cell, it is to be understood that various changes and modifications may be made therein within the scope of the appended claims without departing from the spirit and scope of my invention.

Having thus described my invention, what I claim is:

1. A selenium rectifier cell comprising, a base plate, a selenium layer on said base plate, a non-genetic layer of a saccharide on said selenium layer, and a counterelectrode layer on said non-genetic layer.

2. A selenium rectifier cell comprising, a base plate, a selenium layer on said base plate, a non-genetic layer on said selenium layer composed of one or more substances selected from the group of D-glucose, galactose, xylose, fructose, lactose, sucrose, raffinose, maltose, starch and inulin, and a counterelectrode layer on said non-genetic layer.

3. In a method of manufacturing selenium cells, the step of applying to the selenium layer adhering to a base plate, a solution containing between 0.5 and 4.0 percent by weight of saccharide in water, to form a non-genetic layer on the selenium layer.

4. In a method of manufacturing selenium cells, the step of applying to the selenium layer adhering to a base plate, a solution containing between 0.5 and 4.0 percent by weight of saccharide in water, the solution containing a small proportion of wetting agent, to form a non-genetic layer on the selenium layer.

5. In a method of manufacturing selenium cells, the step of applying to the selenium layer adhering to a base plate, a solution containing between 0.5 and 4.0 percent by weight of saccharide in water, the solution containing a small proportion of gelatine, to form a non-genetic layer on the selenium layer.

6. In a method of manufacturing selenium cells, the step of applying to the selenium layer adhering to a base plate, a solution containing between 0.5 and 4.0 percent by weight of one or more substances from the group of D-glucose, galactose, xylose, fructose, lactose, raffinose, maltose, starch and inulin in water to form a non-genetic layer on the selenium layer.

7. In a method of manufacturing selenium cells, the step of applying to the selenium layer adhering to a base plate, a solution containing between 0.5 and 4.0 percent by weight of one or more substances from the group of D-glucose, galactose, xylose, fructose, lactose, raffinose, maltose, starch and inulin in water, the solution containing a small proportion of gelatine, to form a non-genetic layer on the selenium layer.

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