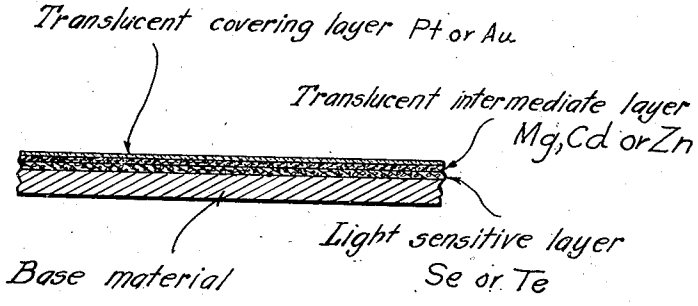
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PHOTOVOLTAIC CELL AND METHOD OF MANUFACTURING THE SAME

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PHOTOVOLTAIC CELL AND METHOD OF MANUFACTURING THE SAME

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2 Claims. (Cl. 136—89)

My invention relates to a novel construction of photoelectric cells and a method of making the same, and more particularly to photovoltaic cells of the layer type which are highly responsive to light radiation, and which generate currents without the aid of an auxiliary source of current.

There are known photovoltaic cells of the above mentioned type comprising a base plate, a layer of light-sensitive material such as selenium in crystalline form or another element of the sixth group of the periodic table of elements with or without materials of higher conductivity mixed thereto, and a translucent homogeneous covering layer of conducting material in finely divided form upon and in intimate contact with the crystalline surface of said light-sensitive layer.

It is also known to provide such cells with a second translucent homogeneous covering layer of conducting material upon said first covering layer, the second covering layer consisting of a material of higher electroconductivity than the first covering layer.

The object of the invention is to raise the potential of cells of the above described type.

The single figure of the drawing shows an embodiment of the invention, the various parts being indicated by legend.

It has been found that by using a mixture of selenium or another light sensitive substance of the sixth group of the periodic table of elements, such as tellurium, with materials of higher conductivity for the light sensitive layer better results are obtained than by using substantially pure selenium or tellurium. This might be traced back to the fact that, although on the surface of a layer of crystalline selenium or the like electrons are readily emitted under the influence of light, the replacement of the emitted electrons of the surface of said layer by electrons from the interior of this layer is retarded by the comparatively high electrical resistance of selenium or tellurium while this replacement is readily effected by electrons supplied by certain conductive materials mixed to the selenium or tellurium. On the other hand, however, it has been found difficult to produce a thoroughly uniform mixture of selenium or tellurium with conductive materials while it is obvious that an absolutely uniform distribution of the conductive admixture is necessary for obtaining the best result.

Now I have found that this difficulty can be eluded by applying a thin intermediate layer of certain elements of the second group of the periodic table of elements in finely divided form between the surface of the light-sensitive layer consisting substantially of selenium, tellurium or the like, and the conducting covering layer. Especially good results have been obtained by applying a thin intermediate layer of magnesium, cadmium or zinc upon and in intimate molecular contact with the surface of the light sensitive layer. It appears that due to the ability of these elements to emit electrons very easily, it is sufficient to have them in intimate molecular contact with the surface of the light sensitive layer for obtaining a considerable increase of the photoelectric efficiency of the cell. On the other hand, there is no difficulty in obtaining a thoroughly uniform distribution of these elements on the surface of the light-sensitive layer by the same methods which have been used with the known cells of the layer type for applying the conducting covering layer to the surface of the light sensitive layer, i. e. by spraying, sputtering, depositing from the vaporous condition or the like under such conditions and at such a temperature that the crystalline structure of the material forming the light-sensitive layer is not substantially modified. For this purpose it is advantageous to use only moderate current strength for sputtering process, or to cool the light-sensitive layer or the sputtering electrodes. With spraying the light-sensitive layer has to be held at such a distance from the spraying nozzle that the metal particles are sufficiently cooled down on their way to the surface of the light-sensitive layer.

With respect to some of the elements of the second group of the periodic table of elements, such as magnesium and cadmium it has been found advantageous to subject the light-sensitive surface covered with them to a moderate heating not exceeding 150° C. With an intermediate layer consisting of cadmium the heating should be effected in air. The heating can take place prior to or after the application of the upper covering layer.

It is advantageous to use for the upper covering layer a non-oxidizable metal, particularly platinum or gold, in finely divided form. For the application of this layer the same methods may be used as for the application of the intermediate layer, especially sputtering.

What I claim is:

1. The method of manufacturing photovoltaic cells comprising applying a thin layer of light-sensitive substance consisting essentially of selenium to a base conductor, transforming said layer into its crystalline form, producing a trans-

lucent covering layer to said light-sensitive layer by applying magnesium in a finely divided condition to the surface of the light-sensitive layer, and producing a further translucent covering layer upon the first covering layer by applying gold in finely divided condition to it.

2. The photovoltaic cell comprising a conducting base plate, a layer of light-sensitive material consisting substantially of selenium in crystalline form upon said base plate, a translucent homogeneous covering layer upon the selenium consisting substantially of gold, and a translucent intermediate layer consisting substantially of magnesium in finely divided form upon and in intimate molecular contact with the surface of the selenium.

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