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ALUMINUM CONTAINER FOR HYDROGEN PEROXIDE

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2 Claims. (Cl. 23—240)

This invention relates to metallic containers for hydrogen peroxide solutions and more particularly to aluminum containers treated to withstand attack by hydrogen peroxide.

This is a division of our co-pending application Serial No. 90,440, filed July 13, 1936.

Repeated statements are found in the literature that hydrogen peroxide attacks metallic aluminum, with the formation of pits and holes, and attempts to use hydrogen peroxide in contact with metallic aluminum containers heretofore have been unsuccessful unless the surface of the aluminum container, in contact with the peroxide, had been given a protective treatment.

Suggestions have been made heretofore to coat the interior of metallic aluminum containers, used for transportation or storage of hydrogen peroxide, either with certain mixtures of paraffin and petrolatum or the like, or to coat the metallic aluminum with an artificial film of oxide by oxidizing the interior surface of the container with nitric acid as an oxidizing acid.

In accordance with the present invention and contrary to the prior teachings, metallic aluminum is used for storage vessels of hydrogen peroxide. However, the surface of the aluminum container is cleaned or etched with a non-oxidizing acid, that is, one which reacts with metallic aluminum without decomposition of its anion, probably removing the adhering oxide film, so that the aluminum metal is exposed to contact with the hydrogen peroxide therein. Thus, an aluminum container, such as an aluminum drum used for transportation of hydrogen peroxide, is filled with sulfuric acid at room temperature and permitted to stand for about one to two hours, the sulfuric acid removed and the drum rinsed with water. The sulfuric acid may be brushed or sprayed upon the interior surface of the container or a small amount placed in the container and agitated therein until the desired contact is obtained. This treatment probably removes the tightly adhering aluminum oxide and leaves a fresh surface of aluminum. Where the drum is not initially clean, it should be washed well with soap and water or with lye or caustic soda solution to remove grease, etc., and well rinsed with water prior to the surface etching with the non-oxidizing acid. In some cases it may be found advantageous to clean the metal surface initially with organic solvents, such as carbon tetrachloride, naphtha and the like.

Sulfuric acid is an excellent non-oxidizing acid for producing an etch on the interior of an aluminum container. In general, the etch can be finished with any suitable concentration of acid, and the time of contact need not be great, a good etch being obtained within a half hour.

Thus a strip of aluminum was etched for 1½ hours in 50% aqueous sulfuric acid and immersed in 100 volume hydrogen peroxide. After five days' immersion the strip showed no signs of pitting.

The surface of the aluminum vessel, after being treated with the non-oxidizing acid, to induce the protective effect or inhibiting action, possesses a dulled and etched appearance without the sheen or polish possessed by the untreated metallic aluminum. Commercial hydrogen peroxide solutions in contact with aluminum surfaces not treated in accordance with the present invention react therewith and pit the same with the formation of a white flocculent material adhering to the aluminum metal and dispersed in the peroxide solution. This action continues and the metal is finally eaten through.

After contact with the hydrogen peroxide solution, the interior of the treated aluminum vessel is generally darkened, appearing brown to black, in direct light and showing interference colors in reflected light indicating the presence upon the metal of a film of deposited material in a fine state of subdivision.

After use, the vessel needs no further or additional treatment with the non-oxidizing acid as the surface, once treated with the non-oxidizing acid, acquires, after use, a passivity or inactivity towards hydrogen peroxide solutions, permitting repeated use in contact with peroxide, although if the surface be marred or scratched, the area should be again treated.

The term non-oxidizing acid as used in the claims designates an acid the hydrogen of which is liberated as gaseous hydrogen when the acid acts upon metallic aluminum.

From the foregoing it will be seen that the present invention provides a method of treating metallic aluminum vessels whereby the same can be used with safety in contact with hydrogen peroxide solutions without the destruction of the

vessel and without adversely affecting the stability of the hydrogen peroxide.

What is claimed is:

1. The method of packaging hydrogen peroxide which comprises treating the interior surface of an aluminum vessel with sulfuric acid to etch the same and thereafter placing hydrogen peroxide in said vessel in contact with the surface so treated.

2. A package comprising a container having an interior surface of aluminum and contents consisting of an aqueous solution of hydrogen peroxide, the interior surface in contact with the peroxide having been etched by treatment with sulfuric acid whereby said surface is resistant to attack and corrosion by the peroxide.

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