G Ab 2.1

DEVELOPMENT OF AN ALUMINIUM BATTERY AND COMPARISON OF ITS PERFORMANCE WITH THE NORMAL DRY CELL

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Lechanche type manganese dioxide battery with zinc anode still remains the most widely used source of electrical power in the primary battery field. However, with the gradual depletion of world's zinc resources

it would become necessary, in the years to come, to develop a battery with a cheaper and a readily available metallic material such as aluminium. The objective of the present work has been to develop a manganese dioxide type battery with aluminium as the anode material instead of the conventionally used zinc anode. This seemed a reasonably good choice since aluminium yields a higher power per unit volume, is higher than zinc in the electrochemical series and is relatively abundant and cheap. The greatest handicap with aluminium is the presence of the stable oxide layer on its surface which contributes to a higher cell resistance.

In order to do a comparative study, two sets of test cells were made of PVC materials and the same cathode and cathode mix were used while one set had aluminium as the anode material and the other had a zinc anode. Their performance was checked by means of discharge curves and flash light tests. The aluminium cell developed showed a reasonably good performance (OCV = 1.50 = 1.56 V) under continuous and intermittent discharge. However, it showed relatively poor storage life due to the corrosion of aluminium. Cells with controlled pH of the electrolyte and with added inhibitors have been investigated in order to increase the storage life of the aluminium battery.

References

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