TECHNICAL REPORT

THE EFFECT OF ADDITION OF COBALT AND SILVER ON GRID CORROSION IN LEAD ACID BATTERY*

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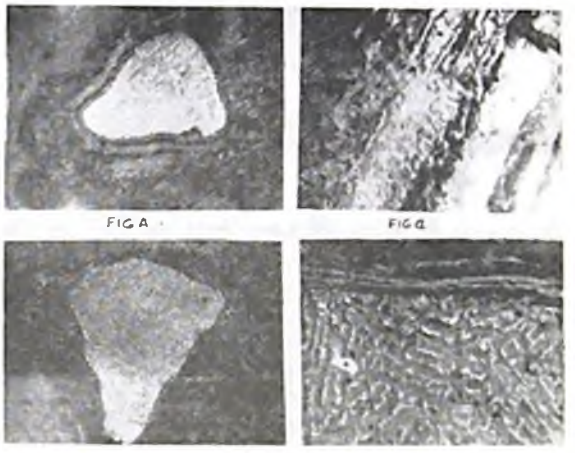
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It is reported that the addition of cobalt to lead acid battery acid/or paste improve the corrosion resistance of the positive grid [1,2]. The reasons attributed to their findings is the lowering of the oxygen overpotential, the significant portion of current being used in the evolution of oxygen [1-4]. The addition of silver has similar effect on the grid corrosion as that of cobalt[3]. However, the nature of the oxide film formed on the grid surface has not been studied so far. Metallographic studies of the oxide film formed on the surface of the grid have been made and the effect of cobalt and silver on the corrosion resistance of grid has been explained based on the nature of the oxide film formed.

The photomicrographs (A&a) show the cross section of a grid taken from a battery containing cobalt sulphate (0.4%) and silver oxide (0.6% by weight) in the active mass and which had finished its life cycle. The corrosion product is thin and compact. Thick, discontinuous and banded corrosion product is observed in the cross section of the grid from a battery without addition agents photomicrograph (B,b.). The compactness or porous nature is being confirmed by the voltage drop measurements across the oxide film.

In the presence of cobalt and silver, the free diffusion of acid to the grid is prevented because of the compactness of the film on the grid during cycling. In the absence of cobalt and silver, the film formed is porous, and unhindered diffusion of acid is possible, with the result the corrosion proceeds continuously. This formation of compact film rendering the grid surface passive at an early stage also accounts for the earlier evolution of oxygen than on the surface without the addition agent.



1. Photomicrograph (A,a) : Cross section of grid taken from battery containing cobalt sulphate and silver oxide as addition agents in active material at 40 x and 240x respectively.

2. Photomicrograph (B,b) : Cross section of grid taken from battery without addition agents in active material at 40 x and 240 x respectively.

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