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Effect of a mineral additive on the electrical performances of the positive plate of lead acid battery.

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Abstract:

The objective of this work is to improve the performance of the positive electrode of lead-acid battery. The use of the additive in the positive paste is to increase the capacity and cycle life of the positive active material. Mineral porous additives, dispersed uniformly in the PAM, may act as acid reservoirs and favor the ionic diffusion. The results show that the addition of mineral additive in the paste before oxidation influences the composition and the crystal size of the PAM after oxidation. We observe a remarkable improvement of the discharge capacity of the PAM for an amount of additive ranging between 1 and 5 %. Nano-sized particles of PbO_2 with amorphous character are obtained. XRD, TG and DSC, SEM, and galvanostatic discharge were used as techniques of investigation.

Key words: Positive plate, Additive of porosity, Discharge capacity, Lead acid battery.

1-Introduction

The lead–acid battery has inherent characteristics that make it attractive for many applications. These include high specific power and power density, high volumetric energy density, and low initial cost. Compared to the negative plate, the positive plate is performance limiting [1–4], and therefore many works have been done to improve its capacity by adding positive plate additives [5–8]. It was concluded that the low coefficient of utilization of the positive active material is due to the fact that pore blockage and the limit of pore size caused by $PbSO_4$ both blocks the diffusion in the pores and leads to a lack of electrolyte [9-11]. Due to the amount of non-reacted material in the form of isolated PbO_2, the specific capacity of the battery is low.

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