铅酸蓄电池板栅用铅合金中锑与锡

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摘要：研究了锑和锡加入铅合金后对铅基合金的影响，并对腐蚀钝化阻挡层形成过程的工作原理进行对比分析，讨论了锑和锡在钝化层中的存在形式和位置。铅锑和铅锡合金板栅表面钝化层由 Pb、铅氧化物、$PbSO_4$、锑氧化物或锡氧化物构成。锑在腐蚀钝化层中以复杂氧化物 $PbSb_2O_6$ 的形式存在；锡在钝化层中的存在形式有 Sn（Ⅱ）氧化物 SnO 和 Sn（Ⅳ）氧化物 SnO_2；此外，Sn 还可以 Sn（Ⅲ）、Sn（Ⅳ）形式嵌入到 PbO/PbO_x 和 PbO_x 晶格中。Sn 在钝化层中既可以沉积在氧化物晶界位置，同时又能渗入到晶格内部。

关键词：铅酸蓄电池；板栅；铅合金

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A comparative study of tin and antimony in lead-acid battery grids

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Abstract: Advances in the role of alloying tin and antimony which were used to manufacture grids in lead acid batteries were studied comparatively. Tin and antimony made great effects on metallic lead, therefore, specific research went on the mechanism of the passive layer developed on lead alloys by various aspects. In addition, the forms and positions of tin and antimony in the passive layer were investigated. The results showed that the passive layer developed on the Pb-Sn and Pb-Sb grids contained Pb, Pb oxides, $PbSO_4$, Sb oxides or Sn oxides as well. Antimony was present in passive layer to inhibit the formation of complex oxides as $PbSb_2O_6$. By contrast, tin was found be mainly as Sn（Ⅱ） and Sn（Ⅳ） ions. Furthermore, Sn（Ⅲ） and Sn（Ⅳ） could be incorporated in the PbO/PbO_x and PbO_x lattices. Tin was not only precipitated at the grain boundaries, but also incorporated in the metallic lattice.

Key words: lead-acid battery; grids; lead alloy