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以废铅酸电池铅膏制备超细氧化铅粉末

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摘 要： 以柠檬酸为主要浸出剂，在室温下合成柠檬酸铅前躯体，将其低温焙烧生成超细PbO/Pb粉末。结果表明：废旧铅蓄电池铅膏的主要成分PbO_2、PbO和$PbSO_4$都能生成柠檬酸铅，铅回收率均在98%以上；由PbO与PbO_2生成的前躯体与标准柠檬酸铅晶型基本相同，结构呈堆积条状，粒径为20~30 μm，而由$PbSO_4$得到的前躯体可能含较多结晶水，与标准柠檬酸铅晶型有较大区别，呈鳞片状结构，粒径为1~10 μm；3种前躯体都能在低温焙烧下得到超细PbO/Pb粉末，粒径为200~500 nm；采用柠檬酸湿法浸取铅膏直接制备电池生产用超细PbO粉体的新工艺，为废旧铅酸电池的回收技术提供了一种新的思路。

关键字： 废铅酸电池；湿法冶金；柠檬酸；超细PbO/Pb粉末

Preparation of ultrafine PbO powders from lead paste in spent lead acid battery

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Abstract: The lead citrate precursors were prepared at room temperature with citric acid as the main leaching agent combined with other additives such as sodium citrate and H_2O_2. The ultrafine lead oxide powder was prepared from the precursors at low temperatures. The results show that the lead pastes can be leached, and crystallized lead citrate precursors are obtained. The rate of conversion of lead is above 98%. The crystalline structures of the lead citrate precursors from lead oxide and lead dioxide match well with the standard citric lead, and the size of the precursors are 20−30 μm. However, there is difference between the structures of the lead citrate precursors from $PbSO_4$ and the standard citric acid-lead crystal, which can be caused by the more crystal water in the structure of the lead citrate precursors from $PbSO_4$. The precursors are columnar structures with size of 1−10 μm. The ultra-fine PbO/Pb powders, with the size of 200−500 nm, are prepared from

three lead citrate precursors at low temperatures. The study indicates a feasible method to prepare ultrafine lead oxide powder from spent lead battery.

Key words: spent lead acid battery; hydrometallurgical process; citric acid; ultra-fine PbO/Pb powder