Investigation of Pb-Sr and Pb-Ca Binary Alloys as Grids for Lead-Acid Batteries

Zhongfei Wu^{1,#}, Chen Hu^{2,#}, Juyi Mu², Zhaoqin Sun², Ruirui Zhao^{1,3,*}, Hongyu Chen^{1,3,*}

¹ School of Chemistry and Environment, South China Normal University, Guangzhou, Guangdong, 510006, China

² State Key Laboratory of Operation and Control of Renewable Energy & Storage Systems, China Electric Power Research Institute, Beijing, 100192, China

³ Base of Production, Education & Research on Energy Storage and Power Battery of Guangdong Higher Education Institutes, Guangzhou, Guangdong, 510006, China

*E-mail: zhaoruirui@m.scnu.edu.cn; hychen@scnu.edu.cn

#These authors contribute equal to this work

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The grid is one of the most important components in lead-acid configuration, thus searching suitable alloys to meet the requirement of the grid is vital and urgent. Considering the similar chemical properties of Sr to Ca, we employed Sr element as a new dopant into the lead matrix, and the detailed properties of this novel binary Pb-Sr alloys are studied. Combining the results from hydrogen/oxygen evolution reaction (HER/OER) study, anti-corrosion investigations under constant potential or current, it can be concluded that this new dopant is not suitable to be used as a sole additive to the grid for a lead-acid battery. The Sr element may accelerate the electrochemical reaction occurred onto the alloys, resulting in deteriorated anti-corrosive properties. Furthermore, the behaviors of the alloys operated under different temperatures (Room temperature and 60 °C) are also studied in this research, aiming to provide some useful guidance in alloy design and application.

Keywords: lead-acid battery; lead alloys; grids; corrosion properties

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