04aD17P

Pb-Liインゴットにおける不純物の同定と腐食挙動への影響
Determination of inclusion in various Pb-Li ingots for fusion blanket application

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Liquid lead–lithium (Pb-Li) blankets have attracted attention in design concepts such as the Helium-Cooled Lithium Lead (HCLL) in EU, the Dual Coolant Lithium Lead (DCLL) in US, the Dual-Functional Lithium Lead (DFLL) in China, and biomass fusion hybrid concept (GNOME) in our group. There are some issues concerning the compatibility of liquid Pb–Li with other system materials. In our previous study, a rotating disk (RD) system was developed and used to evaluate the corrosion or erosion of SiC/SiC composite by the Pb-Li liquid metals during flow conditions at 900ºC for 1000 h [1]. As the result, SiC/SiC composites shows surface modification in Pb–Li. Cross-sectional observations indicated that secondary phases formed from the oxide additive such as Al_2O_3 and Y_2O_3 were attacked by the Pb-Li.

It is known that Li_2O can react with Al and Si (oxides) to form compounds, such as $LiAlO_2$, Li_2SiO_3, and Li_4SiO_4. Therefore chemical state of lithium in liquid Pb–Li should be evaluated to certificate the quality of the Pb-Li. Our recent study revealed that Li-oxide exists in the Pb-Li contacting with monolithic CVD-SiC immersed in the Pb-Li at 900ºC for 1000 h [2]. It should be pointed out that no significant surface modification occurred in the material.

In the present study, we investigates the impurities in various Pb-Li ingots having different concentration of Li. Effect of the impurities especially oxides on the surface modification of SiC materials at high temperature will be discussed.

[1] C. Park, K. Noborio, R. Kasada, Y. Yamamoto, S. Konishi, J. Nucl. Mater. 417 (2011) 1218-1220.
[2] C. Park, R. Kasada, T. Nozawa, H. Tanigawa, S. Konishi, to be submitted.

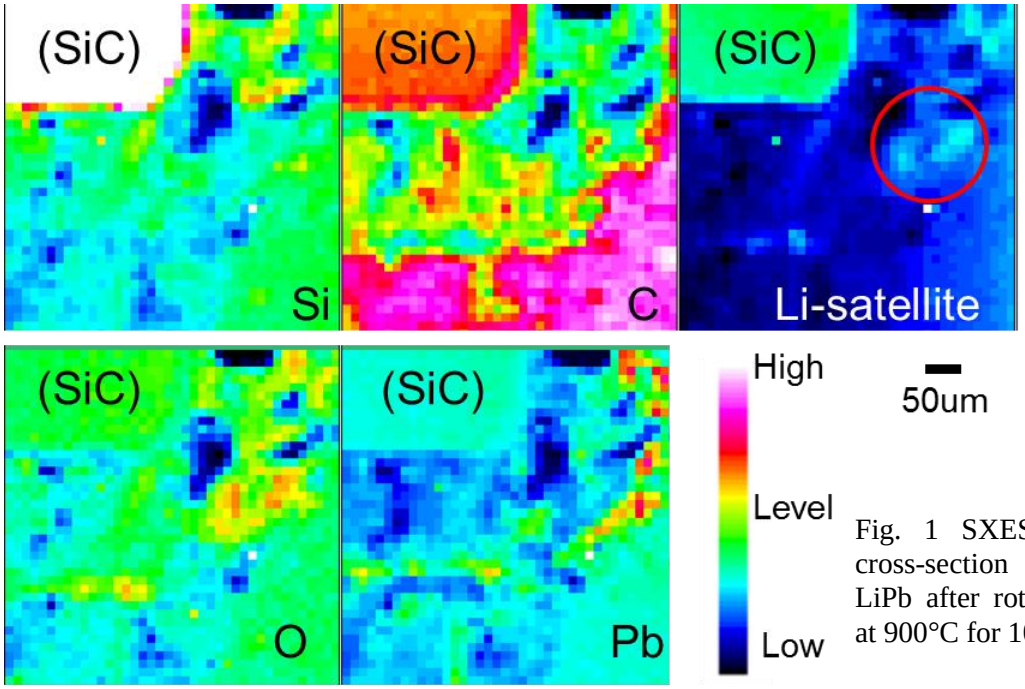

Fig. 1 SXES mapping of the cross-section of CVD-SiC with LiPb after rotating corrosion test at 900°C for 1000h [2].