HIGH-TEMPERATURE ELECTROCHEMICAL DEALLOYING IN MOLTEN SALTS FOR PREPARATION OF NANOPOROUS METALS

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Electrochemical dealloying as a promising method for producing metals with a highly developed surface is extensively studied in aqueous solutions [1, 2]. However, there are practically no works devoted to studying it in liquid salt ionic media at elevated temperatures. In this report we present our first findings of percolation-type electrochemical dealloying of Ag-Zn, Cu-Zn and Au-Ag-Pd in molten alkali chloride eutectics. By electrolysis in potentio- and galvanostatic modes at temperatures from 300 to 700 oC, porous metal structures were obtained with a residual zinc content of 5–10 mol. % and pore size 0.5-1 μm.

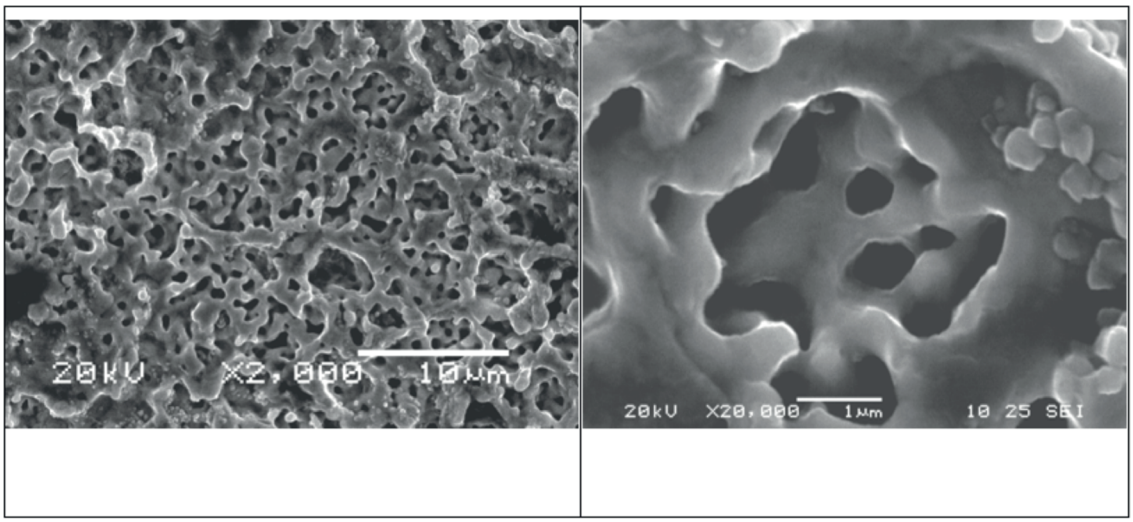

Figure. Micrographs of the metal surface after the $Ag_{0.33}Zn_{0.67}$ dealloying in $LiCl_{0.57}CsCl_{0.26}KCl_{0.17}$ for 30 min at a current density of 35 mA /cm^2 at t=300°C.

We have shown that molten salts as electrolytes can provide the appearance of porous structures during the electrochemical selective dissolution of alloys in percolation mode.

References
1. J. Weissmüller, K. Sieradzki. MRS Bulletin. 2018. 43. P.14.
2. M. Graf, B. Roschning, J. Weissmüller. J. Electrochem. Soc., 2017. 164. P. 194.