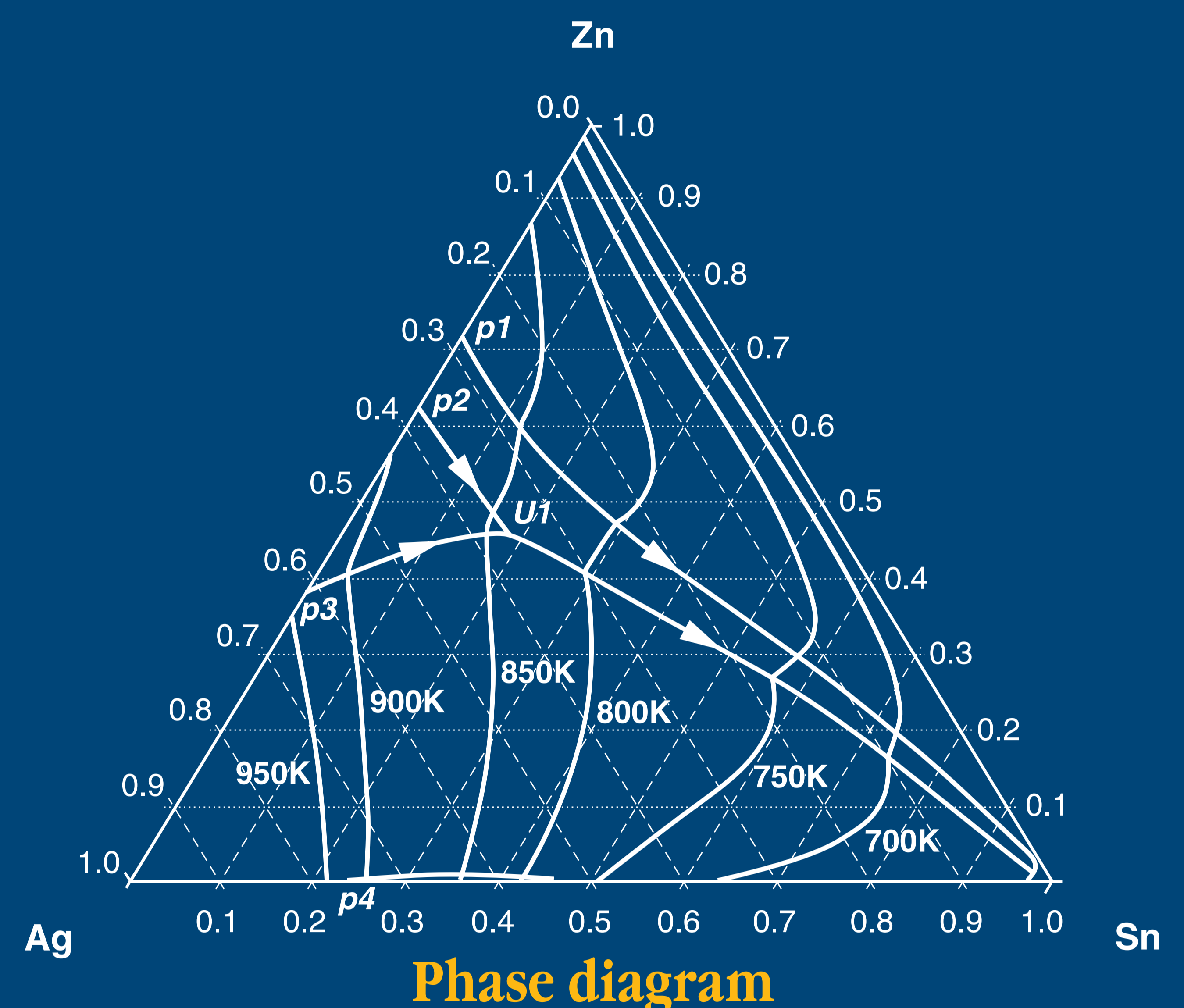




IVAN FRANKO NATIONAL UNIVERSITY OF LVIV NEW MATERIALS FOR LEAD-FREE SOLDERS

Lead containing solders are among the top chemicals posing a great threat to human life and environment. When lead accumulates in the body it can produce various adverse health effects. The industry is greatly interested in the implementation of lead free soldering especially in electronics. For economic and industrial reasons, the new lead free solders are tin-based and substitute traditional Pb-Sn solders. These binary and ternary systems of eutectic and near eutectic concentrations based on lead (Sn) are chosen for their low melting points, good mechanical properties and low cost.

In order to improve mechanical, adhesive, thermomechanical and technological characteristics of Sn-based solders, small Fe and Ni admixtures are added. These admixtures reveal positive influence on the solid solders properties (wetting, creeping, strain). The mixtures stabilize the alloy crystalline structure, which undergoes essential modifications during solidification under external fields (electrical and magnetic fields, temperature gradients, cooling rates, vibrations). The mixtures also prevent fatigue cracks and contact creeps as well as decrease grains.



Authors of the project :

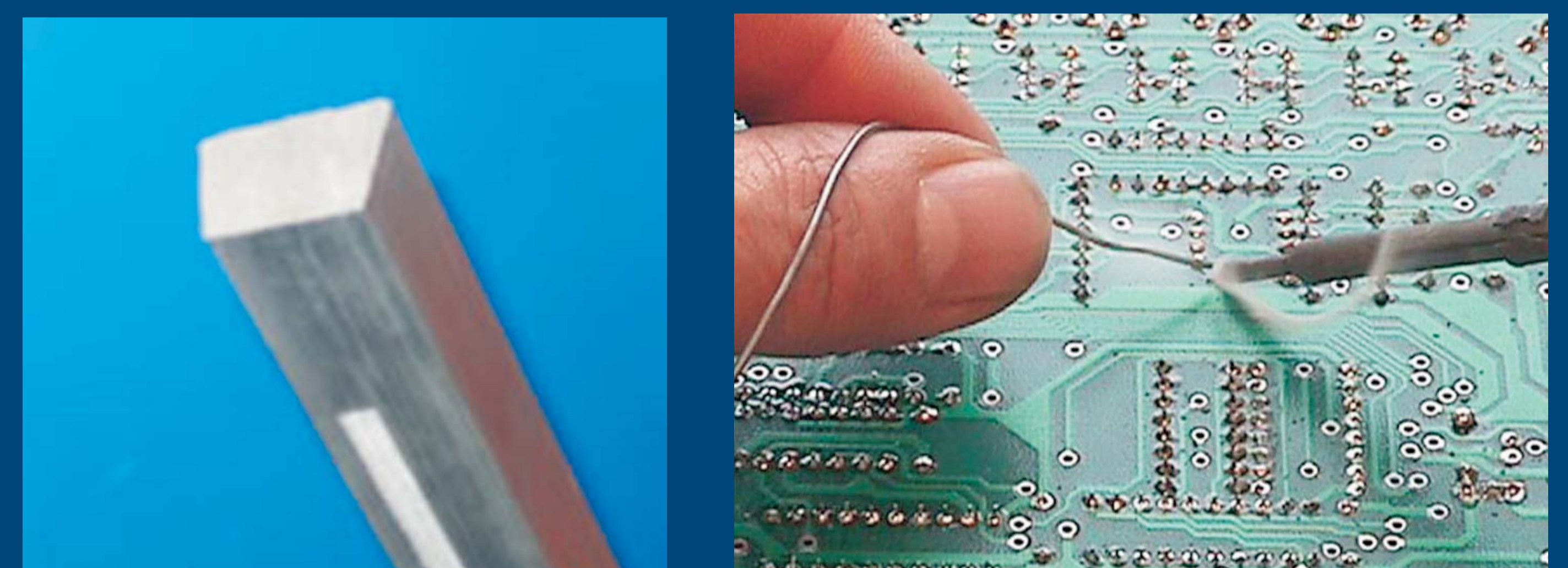
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NEW MATERIALS FOR CHEMICAL SOURCES OF ENERGY BASED ON INTERMETALLIC COMPOUNDS

Project purpose:

obtaining new materials for anodes of lithium and metal hydride batteries with improved specific characteristics.



Pre-production model has been developed

Basic characteristics of lithium-ion batteries:

- value of energy density: 100-240 W•h/kg
- voltage: 1.5-3.2 V
- cycling efficiency >90%
- absence of "memory effect"
- significantly lower inflammability and explosivity in comparison with pure lithium anodes
- temperature range of exploration from -50 to +50 °C

Application fields:

household appliances, radiotechnology, medicine, consumer goods

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Basic characteristics of metal hydride batteries:

- value of energy density: 60-120 W•h/kg
- voltage: 1.3-1.5 B
- cycling efficiency – around 2000 cycles
- ecological safety of alloys (absence of cadmium, mercury)
- temperature range of exploration from -40 to +50 °C

Advantages:

new, ecologically clean, reserve sources of current

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