Komitet za termodinamiku i fazne dijagrame Srbije

u saradnji sa:

Fakultetom tehničkih nauka u Kosovskoj Mitrovici,
Tehničkim fakultetom u Boru i
Associated Phase Diagram and Thermodynamics Committee
(Poland, Czech Republic, Hungary, Bulgaria, Slovenia, Serbia, Montenegro, Romania, Croatia, Bosnia and Herzegovina)

DVANAESTI SIMPOZIJUM O TERMODINAMICI I FAZNIM DIJAGRAMIMA

sa međunarodnim učešćem

ZBORNIK IZVODA RADOVA

Kosovska Mitrovica,
20-21. jun 2025. god.

Dvanaesti simpozijum o termodinamici i faznim dijagramima

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Dvanaesti simpozijum o termodinamici i faznim dijagramima

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Sadržaj

Plenarno predavanje:

Izvodi radova:

Review of material and process parameters in the production of drawn SnPb wire

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Abstract

The aim of this study is to review pre-processing parameters prior to forming SnPb wire through the cold drawing process. The research focuses on different factors such as chemical composition and homogenity, oxide content, and the initial mechanical properties of starting materials prior to plastic deformation. Special attention is given to the selection of appropriate SnPb alloy ratios – primarily Sn60Pb40 and Sn63Pb37, due to their good mechanical, electrical and thermal properties. Further analysis of pre-processing steps such as surface cleaning, tool settings and mechanical processing regime is conducted to determine their effect on drawability, grain boundary behavior, and resistance to fracture during multi-pass drawing. All relevant parameters were analyzed in the context of minimizing processing defects such as wire breakage, ovality, and surface roughness.

It is concluded that chemical homogenity and surface oxides play an important role in achieving a balance between ductility and strength during the processing. This is particularly important, given that the drawing process induces a significant amount of internal stresses. The chemical composition, especially the Sn-Pb ratio, has a major effect on the recrystallization temperature, which is a key factor defining the efficiency of the further plastic deformation. The applied thermomechanical treatment regime plays a crucial role in controlling microstructural evolution and stable drawing performance under industrial-scale production. This study contributes to improving production performance, ensuring high quality tolerances of the final products.

Type of work: original research paper.

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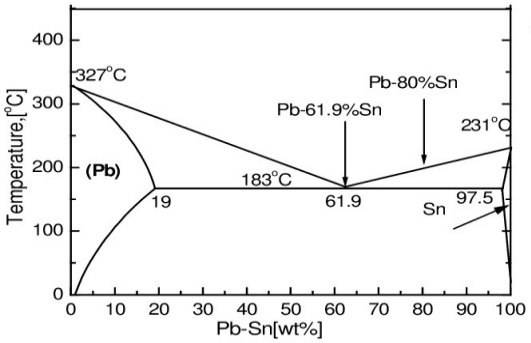
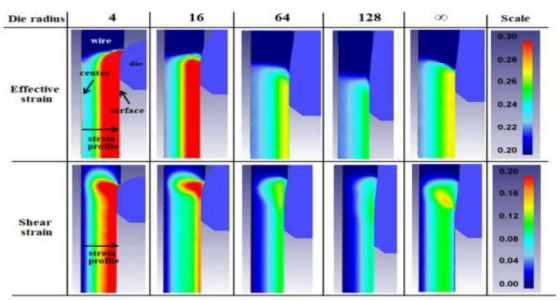
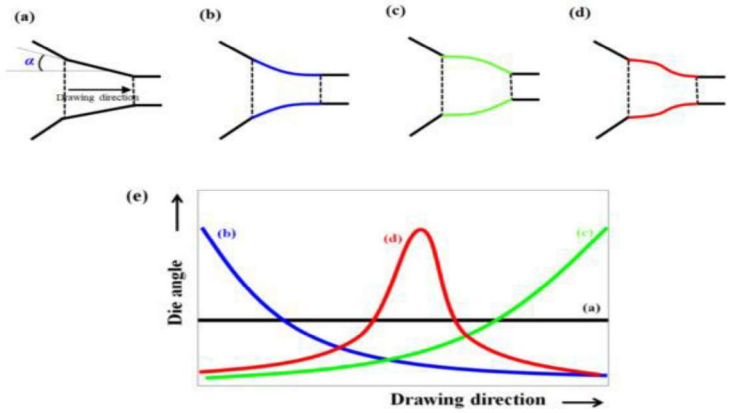
Graphical abstarct:



Pb-Sn phase diagram.



Comparison of contour in effective strain and shear strain of the wire with the die radius.



Schematic explanation of (a) the conventional die, (b–d) streamlined dies, and (e) the variations in die angle along the drawing direction during wire drawing.