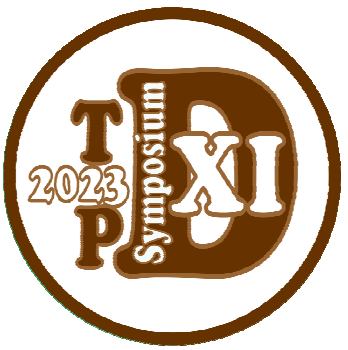
Komitet za termodinamiku i fazne dijagrame Srbije

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)

JEDANAESTI SIMPOZIJUM O TERMODINAMICI I FAZNIM DIJAGRAMIMA

sa međunarodnim učešćem



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Jedanaesti simpozijum o termodinamici i faznim dijagramima

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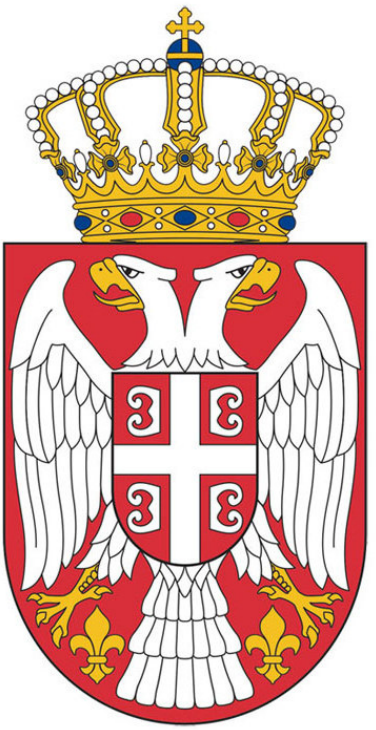

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Jedanaesti simpozijum o termodinamici i faznim dijagramima

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Sadržaj

Plenarno predavanje:

Izvodi radova:

The use of copper and copper alloys for making rondels

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Abstract

This paper presents an overview of the most important characteristics that rondels should have, from which, further, by deep drawing produces a funnel is obtained for the production of lining for cumulative ammunition for the needs of the military industry. The role of the lining is to form a thin jet during the explosion that penetrates the target under extremely high temperature and pressure [1]. The jet damage capacity will mainly be determined by the shape and material of the lining. High density, as well as good thermal conductivity and ductility are the main properties that the lining should satisfy [2].

Although scientific research is increasingly based on the use of composites as a lining material, copper and copper alloys are the most commonly used materials for this purpose. What sets them apart from other materials is their competitive price, as well as the large penetration depth and crater diameter during operation [3]. Numerous studies have shown that the properties of the jet are most significantly influenced by the grain size. Fine grains can be beneficial in delaying jet breakup time, increasing effective jet length, and increasing damage capacity [4-6]. Also, the fine-grained structure leads to an increase in strength indicators, while maintaining good indicators of plasticity, elongation, specific toughness, etc.

Numerous scientists have been engaged in researching the conditions that lead to the reducing of copper and copper alloys grains [7,8]. Their studies showed that microalloying of copper, as well as a properly selected thermomechanical processing regime, can significantly reduce the grain size. In the production of materials with specific characteristics, new processing technologies must be represented, which, in addition to high productivity, should also ensure high quality. Therefore, it is difficult to choose the right thermomechanical regime for the processing of such materials, from which, according to standard norms, certain values of mechanical and structural characteristics are required in advance.

After reviewing the relevant literature, it was concluded that the best properties of the lining are achieved by the thermomechanical processing regime which consists of extruding microalloyed copper (obtained by the up-cast casting process), cold plastic deformation (rolling) and heat treatment.

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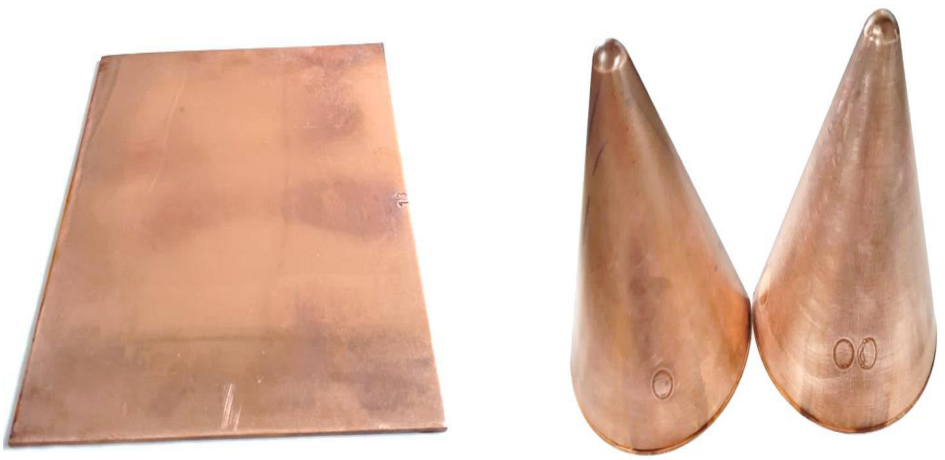
Graphical abstract:



a) *b)*

a) Layout of the finished plate for cutting off copper rondels and b) Layout of the finished funnel