## POLITECHNIKA ŚLĄSKA W GLIWICACH

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## **PRACA DOKTORSKA**

"Identyfikacja efektu temperatury minimalnej plastyczności w stopie CuNi25"

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## Abstract

This work was dedicated to the investigation of the phenomenon of Ductility Minimum Temperature in CuNi25 alloy, observed as the effect of intermediate temperature ductility decrease during high-temperature plastic deformation. On the basis of high temperature ductility tests has been found a relation between microstructure, grain size, chemical composition, type of environment, rate of deformation and effect of DMT. Metallographic SEM and TEM tests have confirmed literature studies that cracks nucleate at points of two or three grain boundaries and cross-cut of twined grain with border of the grains. The non-homogeneous character of chemical composition concentrating in areas of grain boundaries and cracks at high temperature has been investigated by linear and point Cu and Ni analysis. The differences of nickel and copper local concentration, material geometrical structures, size and shape of grains in this case are responsible for dimension of DMT effect. "Inhomogeneities" leading to perturbation in physical and chemical equilibrium provoke lower ductility of material. The "soft" and "hard" places model reflects in macro scale the process of plastic deformation . Therefore, quantity description of this phenomenon in structural scope is very difficult and explanation of DMT has a character of the hypothesis.