

Casting and Characterization of Cu-Al-Bilayer Composites

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Metallic composite materials are of great technical importance. They allow to combine specific positive properties of different materials into one component. In recent years research on the production of copper-aluminum-composites via composite casting has been done with the purpose of combining the excellent electrical and thermal properties of copper with the low density, price and the also good electrical properties of aluminum.

Up to now the basic correlations between processing conditions, metallurgical processes and resultant properties of the composites have not been investigated sufficiently. Therefore it is difficult to evaluate or predict the suitability of cast Cu-Al-composites for further metal forming processing. Of particular interest are the effects of the thermic conditions inside the composite zone on the formation of the boundary layer and the technological properties.

Furthermore no numerical models exist to simulate the resulting microstructure in the composite zone.

Therefore basic knowledge and comprehension of the physical mechanisms of the formation of the boundary layer in dependence on the casting conditions are necessary. For this purpose basic bilayer-composite-casting experiments will be applied to ensure a repeatable production of Cu-Al-composites under varying casting conditions.

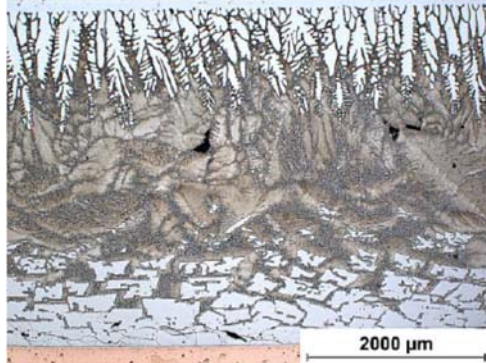


Fig. 1: Boundary layer of a Cu-Al-composite

In addition a simulation model to predict the resulting microstructure in dependence on the casting conditions will be developed and validated.

All in one the comprehension of the correlations between the microstructure, the physical and technological properties and the suitability for further metal forming processing of cast Cu-Al-composites has to be enhanced.