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Fabrication and Processing of Metallurgically Bonded Copper Bimetal Sheets

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Abstract

A novel process chain for the production of metallurgically bonded copper bimetal parts was developed and investigated. This process chain offers a high potential for being an energy- and resource-efficient alternative to cold roll bonding. Research activities in the present paper focused on both the initial bonding between pure copper and tin bronze using horizontal continuous compound casting technology and subsequent shear cutting of the previously cold rolled bimetal. Ultrasonic and shear tensile tests showed that stroke length and casting speed influence the bonding quality in the as-cast state. Alligatoring of the interface during cold rolling does not occur when applying deformation values that are lower than reported minimum values for cold roll bonding. After cold rolling, a shear cutting study proved the feasibility of final processing by varying layer arrangement, material condition and sharpness of the cutting edge radii. Evidence of feasibility was provided as layer delamination did not occur in the study.

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