

Preliminary Studies on Coextrusion of Al-Cu Powder Compacts

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ABSTRACT

Co-extrusion is the process of concurrently extruding two or more materials from a single, composite billet. The extrudate is a composite structure of laminate layers that are metallurgically bonded under the pressures and temperatures of the extrusion process. Although it is possible to cold-extrude certain materials, this research focuses on the hot extrusion of aluminium alloys.

The research focused on a physical and numerical analysis of the extrusion process. A new powder filling technique has been identified to compact the bilayered Al/Cu material. Relative Densities of the experimental and simulated results are compared. Hot extrusion has been carried for different extrusion ratios and die angles and their influence has also been studied.

. The numerical model used was the finite-element modeling (FEM) code DEFORM-2D™, which described the material flow during extrusion. The FEM simulations were also used to predict the state variables of strain and strain rate that are used to model the bonding and interface development that occurs between the alloys during the co-extrusion process. Variables investigated included various core and sleeve thicknesses in the initial billet, different extrusion ratios.

Keywords: Powder Metallurgy; Hot Extrusion; Deform 2D

