Chapter

Introductory Chapter: Emerging Trends in Liquid Metals

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1. Introduction

Liquid metals play a vital role in manufacturing of products. The state of liquid metal influences the microstructure and mechanical properties of end properties. Hardness, tensile strength, impact strength, fatigue strength, wear resistance, corrosion resistance are influenced by the liquid metal during manufacturing processes. Industries focused to produce the components with superior properties by utilizing the liquid metal in an effective way.

Liquid metal used in casting process used to produce the components according to the shape and size of the die used. In this process, the metal is heated in a furnace and reinforcements are added to produce the homogeneous mixture. The liquid molten mixture is poured into the die to produce the castings. Stir casting and squeeze casting process normally employed to produce particle reinforced composites and fiber reinforced composites can be produced by squeeze casting process. The products produced by these processes provide excellent hardness, tensile strength and wear resistance.

In addition, friction stir welding process is used to join similar and dissimilar metals and alloys. In this process, the rotational tool is used and frictional force is used to produce the heat during joining process. The rotational speed, frictional force and tool geometry which influence the properties of aluminum alloy. Industries using friction stir welding process in automotive, aerospace and marine industries because of its better welding efficiency.

At present, friction stir processing is used to modify the properties of materials at surface level. The hardness of materials can be improved by reinforcing nano particles in base material. The reinforcements are placed in holes and the rotational tool is used to produce the surface composites. The products produced by friction stir processing exhibits better hardness, tensile strength, corrosion and resistance to wear.

2. Conclusion

The main aim of this collection of book chapters primarily focused on Liquid metals of various manufacturing process used in aerospace and automobile industries. This volume offers original and experimental results which use new technologies which make the readers to read it. Review and research book chapters present novel research work in the field of composites, welding techniques and aluminum alloy.

The book highlights the investigations on friction stir welding used to improve aluminum alloys, adhesion Phenomenon of liquid metals, secondary aluminum used for producing products, characteristic of an aluminum-silicon alloy in liquid state during the centrifugal casting process and review on melt pool convection during laser material processing.

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