

Science Base for the Joining Technologies of the Future

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Abstract

Welding or joining is a critical technology used in a wide variety of industries. Perhaps because welding is mostly used in construction technology, it is viewed by many as a primitive science. In the last few decades welding has evolved from an almost empirical art to a major interdisciplinary activity requiring synthesis of knowledge from various basic and applied sciences and advanced tools. Scientists from diverse disciplines such as arc and plasma physics, high-temperature chemistry, materials science, computer science, and a wide variety of engineering fields, including mechanical, chemical, electrical, and materials engineering, are making new contributions. Major progress has been made in understanding physical processes, microstructural evolution, and the correlation between microstructure and properties and intelligent control and automation of welding processes.

The presentation will examine significant recent activities in welding science.