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Ultrasonic Welding: Joining of Metals and Multi-Material Structures by Power Ultrasonics

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Message from the Guest Editor

Ultrasonic welding technology for use with metals was invented and patented in the early 1930s. It comprises a solid-state welding technique, where the formation of the bond occurs as a result of a moderate static pressure and superimposed ultrasonic oscillation without reaching their melting points (in principle). The high-frequency relative motion between the parts to be welded forms a solid-state weld through progressive shearing and high plastic deformation between surface asperities that disperses oxides and contaminants.

The Special Issue in Metals should inform readers about the latest developments and innovations in the field of ultrasonic welding. This concerns the progress of hard- and software for ultrasonic welding systems, new, weldable materials, and in particular, their mechanical as well as physical properties. In addition to similar welds, multi-material joints are of also significant interest. New studies regarding the feasibility of innovative joints as well as topics pertaining to the mechanical properties (monotonic, cyclic) of ultrasonically welded components and microstructural investigations to identify the bonding mechanisms are especially welcome.

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Message from the Editorial Board

Metallic materials play a vital role in the economic life of modern societies; contributions are sought on fresh developments that enhance our understanding of the fundamental aspects related to the relationships between processing, properties and microstructure – disciplines in the metallurgical field ranging from processing, mechanical behavior, phase transitions and microstructural evolution, nanostructures, as well as unique metallic properties – inspire general and scholarly interest among the scientific community.

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