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Analysis of defects encountered in resistance spot welding

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Resistance spot welding is an important technique often used in joining thin work-pieces in various aerospace, automobile and manufacturing technologies. The process involves complicated magneto-fluid dynamics, heat transfer, metallurgy, physics and chemistry, etc. This presentation theoretically and quantitatively investigates and interprets processes by realistically accounting for transient magneto-fluid mechanics, heat and species transport and bulk resistance in work-piece and film and constriction resistances at contact interfaces. Contact resistances are functions of temperature, hardness, contact spots, etc. This study reveals defects of surface melting, solute segregation and the computed morphological parameter showing tendency of planar, columnar microstructures, columnar dendrite, equiaxed grains of the weld nugget.

Biography

Peng-Sheng Wei has received his PhD in Mechanical Engineering Department at University of California, Davis, in 1984. He has been a Professor in the Department of Mechanical and Electro-Mechanical Engineering of National Sun Yat-sen University, Kaohsiung, Taiwan, since 1989. He has contributed to advancing the understanding of and to the applications of electron and laser beam, plasma and resistance welding through theoretical analyses coupled with verification experiments. His investigations also include studies of their thermal and fluid flow processes and formations of the defects such as humping, rippling, spiking and porosity. He has published more than 90 journal papers, given keynote or invited speeches in international conferences more than 120 times. He is a Fellow of AWS (2007) and a Fellow of ASME (2000).

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