

Thermal and Structural Characterization of Copper-Steel Bonding Interfaces Produced by Impact Welding

Ignacio Rojas ^{C, S}
UTEQ, CIITEC, Queretaro, México

A characterization of impact bonded Cu–steel was carried out using photothermal radiometric (PTR) spectroscopy, scanning electron microscopy (SEM), microhardness, and X-ray diffraction (XRD) in order to study the changes in the structural, metallurgical, and thermal properties in the samples of Impact Welding Zone (IWZ) and the Impact Affected Zone (IAZ) after the impact welding. The characterization was performed on three samples with different morphological interfaces. According to the SEM analysis in etched samples, it was possible to determine that the IWZ is formed by the deformation of Cu and steel (ferrite and pearlite) into the Cu–steel interface and the IAZ are formed in a region close to the IWZ with low grain damage. Microhardness Vickers test is able to detect the IAZ in all cases, but due to its contact character, it is not possible to obtain continuous hardness information across the Cu–steel interface. According to the XRD patterns after the impact welding process, no new phase was formed. Noncontact PTR amplitude and phase images are able to identify the IAZ and the IWZ.