PAPER ID:189

EFFECT OF HEAT GENERATION ON STIR ZONE MICROSTRUCTURE OF FRICTION STIR WELDED OF Cu-Cr-Zr Plates

Kaushal Jha, Santosh Kumar, R N Singh and G K Dey

Bhabha Atomic Research Centre, India

ABSTRACT

Copper based alloys are technologically important material primarily because of their high thermal and electrical conductivity. Among these alloys, precipitation hardened Cu-Cr-Zr alloys is considered for structural material due to its superior combination of mechanical and thermal properties. Due to these exceptional properties, this alloy has been considered for many industrial applications including nuclear applications. Welding of copper alloys have always been challenging. In the present work, friction stir welding (FSW) was carried out to produce sound and defect free weld joints of CuCrZr alloy plates. The main objective of the work was to study the effect of weld thermal cycle on stir zone microstructure. The weld thermal cycles (WTC) were varied by changing the weld parameters like tool rotation and tool travel speed and was measured and recorded at 2 mm and 12 mm away from the shoulder. Microstructural characterization was carried out at different length scales. The effect of WTC was observed on grain size in the stir zone. The results indicated that though the peak temperatures were not much different but grain size of the stir zone had range of submicrons to few micrometers. Microhardness measurements across stir zone also had signature of the effect of the weld thermal cycle. These results are presented and discussed in this paper.

 ISBN: 978-81-947843-2-6; DOI: 10.21467/abstracts.108