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Effect of post weld heat treatment on microstructure and mechanical properties of friction stir welded Cu-alloy joints

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For environmental protection and energy saving, weight reduction of various transportation components having been required. Many researchers and engineers are focusing on 'multi-materials concept' for auto-body. In this case, dissimilar metal joining becomes a key technology. Friction stir welding (FSW) process is being studied as one of the promising methods to obtain sound joints. In the past, many studies about FSW of aluminium alloys, magnesium alloys and steels were performed and reported. However, that of copper alloys was nearly not found. In this study, the authors successfully conducted friction stir welding on copper-beryllium alloy plates, and investigate the effects of post weld heat treatment (PWHT) on microstructure and mechanical properties of the joints. Tensile test and Charpy impact test were performed to evaluate mechanical properties, and optical microscopy (OM), scanning electron microscopy (SEM) and transmission electron microscopy (TEM) were selected to observe microstructural evolution during post weld heat treatment. After FSW, tensile

strength decreased, but toughness increased. According to the consistent PWHT, tensile strength was recovered as a level of base metal. The authors consider that precipitation behaviour during PWHT affect to the recovery of mechanical properties of the joints.

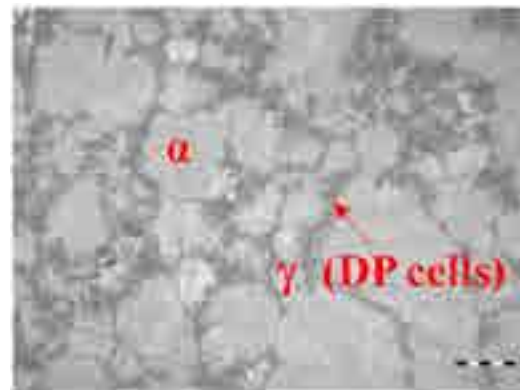


Figure 1: Microstructure of PWHTed FSW joint.

Biography

Kwangjin Lee has completed the PhD at the age of 33 years from Tokyo Institute of Technology and had worked at KOBELCO Co. Ltd. Tokyo. He is the principal researcher of Korea Institute of Industrial Technology. He has published more than 40 papers in reputed journals and has been serving as an editorial board member of repute.

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