

Microstructural Analysis of Banded Structure in Friction Stir Welding of AA6082 Aluminum Alloy

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Abstract

Friction stir welding (FSW) of two AA6082 plates was studied by microstructural and nano-indentation investigation. FSW parameters were so that it can be considered as high heat input process. Banded structure usually known as onion rings were observed in the advancing side of the nugget. The microstructure of this area was precisely investigated and it was found that onion rings contain two different grain sizes and manifested in two different contrasts of dark and bright bands by optical metallography. EBSD study revealed also different crystallographic orientation in the bands. Hardness measurement using nano-indentation passing over the bands showed some fluctuations which did not necessarily matched with the grain size changing.

Keywords: Friction stir welding; Onion rings; Microstructure; Nano indentation; Al 6082.