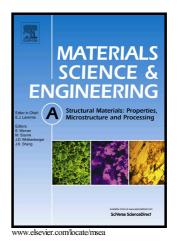
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Two-pass Friction Stir Welding of Aluminum alloy to Titanium alloy: A Simultaneous Improvement in Mechanical Properties

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Abstract:

During Friction Stir Welding (FSW) of aluminum (Al 2024) to titanium (Ti-6Al-4V), it is observed that titanium fragments at the interface get distributed in the weld nugget. These particles are both coarse and fine in size. Such a particle distribution, particularly due to presence of coarse particles, is expected to negatively impact the mechanical properties of the welds. In an effort to further fragment the coarse Ti particles, FSW was performed with an additional pass in the weld nugget region. Characterization was done using X-ray Micro-Computed Tomography (XCT), Scanning Electron Microscope (SEM) equipped with an Energy Dispersive Spectrometer (EDS), X-ray Diffraction and Electron Back-scattered Diffraction (EBSD) method. Tensile tests were performed to determine the mechanical properties of the weld. The Ti particles of various shapes and sizes were seen to be inhomogeneously distributed in the weld nugget even after the second pass. A detailed observation revealed that the larger particles (as flakes) were inhomogeneously distributed but the finer particles (more spherical) were homogeneously distributed in the weld nugget. Download English Version:

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