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**Microstructural evolution and mechanical properties of the stir zone during
friction stir processing a lean duplex stainless steel**

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Abstract

A lean duplex stainless steel was friction stir processed at 300 rpm-100 mm/min using a W-Re stirring tool. The microstructural evolution on the advancing side, the center, and the retreating side of the stir zone were studied by a combination of electron microscopy and electron backscattered diffraction. The study indicated that the direction of fiber structure on the advancing side, center, retreating side were 0, 90, 45-deg relative to the processing direction because of the stirring effect of the tool. Given that the strain rate and temperature were different on the advancing side, center

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