

Meeting	<u>2022 TMS Annual Meeting & Exhibition</u>
Symposium	Materials Design and Processing Optimization for Advanced Manufacturing: From Fundamentals to Application
Presentation Title	Healing Damage in Friction Stir Processed Mg ₂ Si Reinforced Al Alloy
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On-Site Speaker (Planned)	Julie Nathalie S Gheysen
Abstract Scope	During service life of Al alloys, damage occurs due to the presence of large intermetallic particles. Damage healing is a new paradigm to extend materials lifetime. In the present work, a new class of healable Al-0.5Mg ₂ Si alloy is produced by Friction Stir Processing (FSP). In-situ tensile Scanning Electron Microscopy (SEM) tests have shown that sacrificial healable particles change damage mechanism by breaking first, while Fe-rich intermetallics are mostly remaining intact. The pre-damaged samples produced by a micro-tensile machine were further investigated by in-situ heating TEM including EDX analysis and automatic crystallographic orientation in TEM as well as atom probe tomography (APT) in order to track healing evolution of damaged particles and reveal healing mechanism. In situ X-Ray nano holotomography experiment carried out at ESRF with a pixel size of 35 nm provided additional statistical data on the healing ability of the bulk material after heating for various times at 400°C.
Proceedings Inclusion?	Planned:
Keywords	Aluminum, Characterization, Other