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Characterizing liquid metal embrittlement during resistance spot welding of Zn coated steels

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This research investigates liquid metal embrittlement (LME) occurrences during resistance spot welding (RSW) of zinc-coated steels. LME is a common issue in RSW, where the interplay of temperature, stress, and steel microstructure creates conducive conditions for embrittlement. The primary objective is to study the impact of microstructure on LME phenomena. Using analytical techniques such as Energy Dispersive Spectroscopy (EDS) and Electron Backscatter Diffraction (EBSD), the study characterizes the stress-assisted grain boundary diffusion of zinc within the steel matrix. Additionally, it examines the influence of grain size and grain boundary characteristics, such as misorientation, in determining the crack propagation path during LME. Through systematic characterization, this work aims to enhance understanding of the mechanisms underlying LME in RSW of zinc-coated steels, offering insights crucial for devising effective mitigation strategies.