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The role of local plasticity during very high cycle fatigue crack initiation in high-strength steels

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Keywords

Very high cycle fatigue, fine granular area, high-strength steel, non-metallic inclusion, fatigue crack initiation, plastic zone size

Highlights

1. The spatial geometry of the fine granular area (FGA) at the crack origin is systematically analyzed with focused ion beam and transmission electron microscopy
2. The microstructural changes inside the FGA correlate well with calculated local plastic zone sizes
3. FGA formation and crack initiation during VHCF can be a result of local plasticity
4. A model for FGA formation by local plasticity induced grain refinement is proposed

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