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Atom probe tomographic observation of hydrogen trapping at carbides/ferrite interfaces for a high strength steel

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Highlights

- 3DAP is used to characterize the H distribution on carbides.
- Direct evidences of H trapping at the carbide/ferrite interfaces are provided.
- Hydrogen is mainly trapped on carbide/ferrite interfaces along GBs.

Abstract

A three-dimensional atom probe (3DAP) technique has been used to characterize the hydrogen distribution on carbides for a high strength AISI 4140 steel. Direct evidence of H atoms trapped at the carbide/ferrite interfaces has been revealed by 3DAP mapping. Hydrogen is mainly trapped on carbide/ferrite interfaces along the grain boundaries. Slow strain rate tensile (SSRT) testing shows that the AISI 4140 steel is