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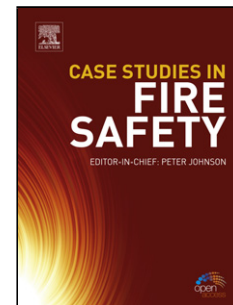
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# Insights into the role of grain refinement on high-temperature initial oxidation phase transformation and oxides evolution in high aluminium Fe-Mn-Al-C duplex lightweight steel

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## Highlights

- Grain refinement alters oxide composition and distribution at initial oxidation stage
- Unstable / metastable oxides prefer to form in the oxide scale of fine-grained sample
- Grain refinement hinders the extension of internal oxidation at high temperature
- Grain refinement accelerates the formation of ferrite phase transformation layer

**Abstract:** Influence of grain size on internal oxidation behaviour at 1273 K in dry air of Fe-20Mn-8Al-0.45C (wt. %) has been investigated. The measured weight gains are in parabolic relation to oxidation time and parabolic rate constant degrades with the reduction of grain size.

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