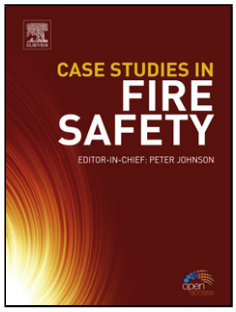

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Insights into the role of grain refinement on high-temperature initial oxidation phase transformation and oxides evolution in high aluminium Fe-Mn-Al-C duplex lightweight steel

Wei Peng[a], Jingjing Wang[c], Huawei Zhang[a], Xiaoyu Hong[a], Zhaoyu Wu[a], Yulai Xu[a], Jun Li[a], Xueshan Xiao[a,b]*

a. Laboratory for Microstructures, Institute of Materials, Shanghai University, Shanghai 200072, China

b. Shanghai University Xinghua Institute of special Stainless Steel, Jiangsu 225721,China

c. School of Materials Science and Engineering, Shanghai University, Shanghai 200444, China

* Corresponding author: Tel.: +86 21 56331484; Fax: +86 21 56331484.

E-mail address: xsxiao@mail.shu.edu.cn

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.