

# Accepted Manuscript

Elasto-plastic phase field modelling of oxidation of zirconium alloys

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PII: S0020-7683(17)30492-4  
DOI: [10.1016/j.ijsolstr.2017.10.033](https://doi.org/10.1016/j.ijsolstr.2017.10.033)  
Reference: SAS 9785



To appear in: *International Journal of Solids and Structures*

Received date: 12 August 2017  
Revised date: 17 October 2017  
Accepted date: 27 October 2017

Please cite this article as: Yunong Zhao , Shigang Ai , Daining Fang , Elasto-plastic phase field modelling of oxidation of zirconium alloys, *International Journal of Solids and Structures* (2017), doi: [10.1016/j.ijsolstr.2017.10.033](https://doi.org/10.1016/j.ijsolstr.2017.10.033)

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**Highlights:**

- A phase field model coupled with elasto-plastic and creep constitutive model is proposed to study the oxidation behaviour of zirconium alloys.
- The corresponding finite element formulations are derived.
- Some novel mechanical failure mechanisms of the protective oxide layer are revealed.

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