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Failure Mechanisms in Metallic Materials

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Message from the Guest Editors

Dear Colleagues,

Metallic materials experience various extreme and complex conditions during their in-service condition. Irreversible deformation behaviours occur during complex conditions, manifested in localised slip, fatigue crack nucleation, short-crack propagation, and ultimate failure events. Recently, understanding their failure mechanisms has become a trending problem in a wide range of environmental, energy and aerospace applications. Significant advances have been made in microstructure-based crystal plasticity modelling and in-situ electron microscopy to quantitatively characterise the origin and evolution of failure events at small scale. Meanwhile, considerable interest has arisen in linking macroscopic properties to material microstructure across different length and time scales. Furthermore, the establishment of frameworks integrating experimentation and modelling to understand complex coupled environmental effects, such as hydrogen embrittlement, extreme high temperature, irradiation damage, and corrosion cracking, is crucial to reveal the physical mechanisms behind phenomena.



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Special Issue



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Message from the Editor-in-Chief

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