Special Issue

Fatigue and Fracture in Advanced and Sustainable Materials

Message from the Guest Editors

Advances in understanding and addressing fatigue and fracture have led to the development of new methods for prediction, testing, and improving materials, structures, and mechanical components. These advances continue to improve structural integrity. The techniques that contribute to improving structural integrity are Phase-field Models, Crystal Plasticity Modeling, Finite Element Analysis, Predictive Models, AI-based Diagnostics, Automated Material Design, Digital Image Correlation, Acoustic Emission, Ultrasound and Thermography, Transmission Electron Microscopy (TEM), Scanning Electron Microscopy (SEM), High-Resolution X-ray Tomography, Multiaxial Fatigue and Fracture testing, Fatigue of Additive Manufacturing materials, LSD, Surface Nanocrystallization, and Advanced Coating. Some approaches focus on measuring the energy dissipated during cyclic loading and using energy-based criteria to predict crack propagation. These methods combine advanced simulation techniques, real-time monitoring, and the development of new materials, such as shape memory alloys (SMAs), metallic glasses, high-entropy alloys (HEAs), hydrogels, soft polymers, bone, and biological tissue.

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As the world of science becomes ever more specialized, researchers may lose themselves in the deep forest of the ever increasing number of subfields being created. This open access journal Applied Sciences has been started to link these subfields, so researchers can cut through the forest and see the surrounding, or quite distant fields and subfields to help develop his/her own research even further with the aid of this multi-dimensional network.

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