Special Issue

EBSD of Additively Manufactured Metals

Message from the Guest Editors

AM of metals has advanced considerably in the past decade, leading to the production of components from a wide spectrum of alloys. The local processing conditions under which a part is formed can have dramatic effects on the micro- and defect structures within the part, thus affecting its properties, such as mechanical behavior and fatigue resistance. Under multiple processing conditions, grain morphologies can be quite complex, and large strain gradients may develop in the microstructure due to rapid solidification. These strain gradients manifest in orientation gradients within grains. EBSD can be used to capture complex grain structures, orientation gradients, and defect structures within the AM microstructure. Such information can improve our understanding of the effect of processing parameters on the microstructural evolution of materials and provide critical insights for property prediction models. Microstructural control achievable via AM has the capability of optimizing a component's microstructure by taking advantage of the inherent anisotropy in crystalline materials. Information provided by EBSD is thus a critical variable in microstructural design.

Guest Editors

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Metallic materials play a vital role in the economic life of modern societies; contributions are sought on fresh developments that enhance our understanding of the fundamental aspects related to the relationships between processing, properties and microstructure – disciplines in the metallurgical field ranging from processing, mechanical behavior, phase transitions and microstructural evolution, nanostructures, as well as unique metallic properties – inspire general and scholarly interest among the scientific community.

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