Multifunctional powder feedstock as a key enabling technology in additive manufacturing

Daniel Salazar[1]

[1]BCMaterials, Basque Center for Materials, Applications and Nanostructures, UPV/EHU Science Park, Leioa, Spain.

The development of key enabling technologies such as additive manufacturing of functional metals is one of the current challenges in modern society due to the complex relationship between the processing of the feedstock, in the form of powder or wire, the resulting microstructure and the final performance of the printed material. However, several problems encountered under typical manufacturing conditions must first be overcome to implement this technology in realistic applications. In the case of soft and hard magnetic materials, their functional properties come from the specific micro or nanostructure developed during manufacturing and further sintering will be detrimental to its properties. For structural materials, such as lightweight aluminum, different considerations should be taken into account, as the formation of porosity, texturization and the improvement of its strength by the addition of ceramic nanoparticles in the material. Some case studies using the above materials will be presented and recommendations for obtaining good printed material will be described.