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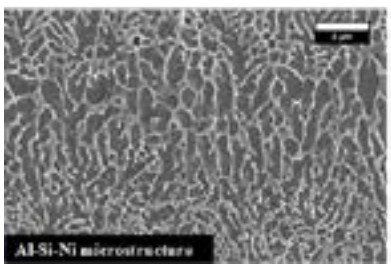
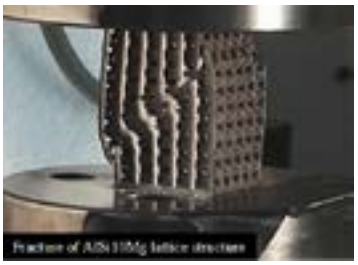
Strategic developments and future prospects of metal additive manufacturing

Nowadays additive manufacturing (AM) techniques are recognized to be promising technologies with an enormously growing of research activities in the scientific and industrial panorama. In particular, AM of metal parts and advanced net shape metal powder technologies provide marked economic and technical gains in the production of small-to-medium parts with materials difficult to be processed. Notwithstanding this, the efficiency of processes and supply chain is strongly influenced by the limited materials palette currently available on the market, the high costs and very high time-to-deliver of the powders, the quality and reproducibility modifying the features of the final components. In addition, the exploitation of manufacturing systems in industrial productions dictates high quality processes with efficient control strategies. Considering all these aspects, a deep knowledge of part redesigns and process optimization is necessary in order to enhance part quality and to obtain a cost reduction, for new applications or future perspectives from the point of view of the final users and new adopters of additive technologies. At the same time, the control and the optimization of material behavior in process and post-process conditions is fundamental for increasing AM industrial exploitation, together with the development of new materials, such as aluminium alloys and metal-matrix composites, nickel super alloys, titanium alloys and steels for laser-based AM, intermetallic materials and super-alloys for electron beam melting.





Recent Publications

1. Ferro Carlo Giovanni, Varetti Sara, Maggiore Paolo, Lombardi Mariangela, Biamino Sara, Manfredi Diego and Calignano Flaviana (2018) Design and characterization of trabecular structures for an anti-icing sandwich panel produced by additive manufacturing. Journal of Sandwich Structures and Materials ISSN:1099-6362.

2. Aversa Alberta, Lorusso Massimo, Cattano Giulio, Manfredi Diego Giovanni, Calignano Flaviana, Ambrosio Elisa Paola, Biamino Sara, Fino Paolo, Lombardi Mariangela and Pavese Matteo (2017) A study of the microstructure and the mechanical properties of an AlSiNi alloy produced via selective laser melting. Journal of Alloys and Compounds ISSN:0925-8388.
3. Bassini Emilio, Vola Valeria, Lorusso Massimo, Ghisleni R, Lombardi Mariangela, Biamino Sara, Ugues Daniele, Vallillo Gianfranco and Picqué Benjamin (2017) Net shape HIPping of Ni-superalloy: Study of the interface between the capsule and the alloy. Materials Science and Engineering a-Structural Materials Properties Microstructure and Processing ISSN:0921-5093.
4. Mazzucato Federico, Tusacciu Simona, Lai Manuel, Biamino Sara, Lombardi Mariangela and Valente Anna (2017) Monitoring approach to evaluate the performances of a new deposition nozzle solution for DED systems. Technologies ISSN: 2227-7080.
5. Baudana Giorgio, Biamino Sara, Ugues Daniele, Lombardi Mariangela, Fino Paolo, Pavese Matteo and Badini Claudio (2016) Titanium aluminides for aerospace and automotive applications processed by electron beam melting: contribution of Politecnico di Torino. Metal Powder Report 193-199.

Biography

Lombardi Mariangela is an Associate Professor in Material Science and Technology. She holds a PhD degree in Materials Science and Technology from Politecnico di Torino and INSA (Institut National des Sciences Appliquées) of Lyon (2009). She gained experience in the field of material research over the last 10 years. She is involved in about 12 Regional, National or European projects focused on materials development and optimization, characterization and testing. She is Author of about 80 papers, including publications on international papers and international conference proceedings, in the areas of material science and engineering.

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