Title: Additive Manufactured Lightweight Porous Materials

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Abstract:

Nowadays, lightweighting is an important topic for global researchers since it is a significant and efficient way to save energy and reduce carbon emission. There are two major approaches to achieve the propose of lightweighting, one is to introduce the materials with high specific strength and the other one is to vary the design by introducing the topology or lightweight porous structure. Either of these two approaches was very difficult to be achieved due to the limitation of traditional process. However, due to the maturation of additive manufacturing process, it is possible to realize these two approaches at the same time. In this study, a high specific strength Al alloys was introduced to fabricate samples by using selective laser melting (SLM) process. Meanwhile, a porous structure was introduced to develop the potentially lightweight materials. To further examine the potential of this high specific strength porous material as a lightweight material, the porous samples with different porosity were fabricated. In this research, all of the samples were analyzed and tested carefully, including XRD, SEM, and compression test. The relationship between the materials, process, porous structure, microstructure, and mechanical properties is explored and discussed in details.

Recent Publications:

1. Y.C. Wu, **C.N. Kuo***, M.Y. Shie, Y.L. Su, L.J. Wei, S.Y. Chen, J.C. Huang, Structural design and mechanical response of gradient porous Ti-6Al-4V fabricated by electron beam melting, Materials and Design, 158 (2018) 256-265.
2. Zhong Xun Khoo, Yong Liu, Jia An, Chee Kai Chua, Yu Fang Shen, and **Che Nan Kuo***, A Review of Selective Laser Melted NiTi Shape Memory Alloy. Materials, 11, 4 (2018)., 519.
3. S.Y. Chen, **C.N. Kuo***, Y.L. Su, J.C. Huang*, Y.C. Wu, Y.H. Lin, Y.C. Chung, and C.H. Ng, Microstructure and fracture properties of open-cell porous Ti-6Al-4V with high porosity fabricated by electron beam melting, Mater. Charact., 138 (2018) 255-262.



Biography:

Dr. Che-Nan Kuo, Assistant Professor, Department of Bioinformatics and Medical Engineering, Asia University, Taichung, Taiwan. He dedicated himself in study the metal 3D printing for over 4 years. His research topics are focused on the 3D printed advanced materials and porous materials.

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