

Additive Manufacturing of High-Entropy Alloys

Javad Karimi¹, Nikhil Kamboj¹, Prashanth Konda Gokuldoss^{1,2}

¹*Department of Mechanical and Industrial Engineering, Tallinn University of Technology, 19086, Tallinn, Estonia*

²*Erich Schmid Institute of Materials Science, Austrian Academy of Sciences, Jahnstraße 12, A-8700 Leoben, Austria*

e-mail of presenting author: jkarim@ttu.ee

Selective Laser Melting (SLM) is an additive manufacturing technique, which produces complex metallic components from alloy powder by selectively melting micron-sized powder in successive layers. This process is characterized by highly localized heat inputs with rapid solidification. High Entropy Alloys (HEAs) are a relatively new metal alloy system that have promising potential in high temperature applications due to its sluggish diffusion behavior. In the present study, high entropy alloy with pre-alloyed powders were fabricated using SLM with a pulsed Yd:YAG laser. The process parameters were optimized carefully to eliminate the possible defects like cracks and pores that arise during the fabrication process. The SLM fabricated high entropy alloys were characterized for its density. Microstructural characterization was carried out using both optical and scanning electron microscopy. The present results explore the possibility of fabricating high entropy alloys using additive manufacturing process like the SLM.

References

1. M.H. Tsai, J.W.Yeh, 2014, *Mater Res Lett*, 2, 107.
2. J.W.Yeh, S.K.Chen, S.J.Lin, J.Y.Gan, T.S.Chin, T.T.Shun, C.H.Tsau, S.Y.Chang, 2004, *Adv. Eng. Mater.*, 6, 299.
3. D.B.Miracle, O.N.Senkov, 2017, *Acta Mater.*, 18,1758.



Euroopa Liit
Euroopa
Regionaalarengu Fond



Eesti
tuleviku heaks