Non-Melting-Based Metal Additive Manufacturing Technologies

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Abstract

Metal Additive Manufacturing (AM) has grown to become an accepted processing method for the fabrication of prototype metal and alloy parts [1]. The process has also been used to fabricate low to moderate volume serial production of complex shaped parts without any tooling. To date however, the majority of these metal AM technologies have been based on melting type of processes, such as laser or electron beam melting, which are generally too expensive for prototyping and too slow for mass production. To address these issues, recent advances in non-melting-based metal AM technologies have been developed that are based on extrusion and binder jetting [2]. The Bound Metal Deposition (BMD) is a versatile 3D printing process that offers the capability of fabricating metal AM prototype and low volume serial production parts in an office-type environment [3]. To address mass production in a cost-effective manner, two recent processes based on binder jetting technology have been developed. This presentation will provide an in-depth look at both the development and processing of metal and alloy parts based on these technologies.

References

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[3] A. Bose, C.A. Schuh, Jay C. Tobia, N. Tuncer, N.M. Mykulowyczd, A. Preston, A.C. Barbati, B. Kernan, M.A. Gibson, D. Krause, T. Brzezinski, J. Schroers, R. Fulop, J.S. Myerberg, M. Sowerbutts, Y-M Chiang, A.J. Hart, E.M. Sachs, E.E. Lomelie, A.C. Lund, International Journal of Refractory Metals and Hard Materials, (2018), 22

Figures

Figure 1: Picture of Studio System™ used for prototyping and low volume serial production

Figure 2: Picture of the Production System™ used for mass production of metal AM parts