Additive manufacturing of shape memory alloys

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For decades, shape memory alloys (SMA) have been considered as a class of fascinating materials for various structural and functional applications due to their unique shape memory effects (SME) and superelasticity (SE). With the recent prevalence of emerging additive manufacturing (AM) techniques, the design and fabrication of highly complex SMA structures coupled with tailorable SME and SE become possible, which further opens up new opportunities for numerous applications. This work will first shed light on the current status and development of AM of SMA in recent years. Then, some key scientific questions related to AM of SMA will be introduced and discussed, e.g., the influence of processing parameters, element evaporation, oxygen pick-up, precipitation and crystallographic textures on the phase transformation behaviour of the AM fabricated SMA. Following this, the mechanical and functional properties (i.e., SME and SE) of AM fabricated SMA will be covered. In the end, some potential applications and future development trend for AM of SMA will be provided.