航太級金屬3D列印製造技術

Aerospace-Grade Metal 3D Printing Manufacturing Technology

簡介(中/英)

國家中山科學研究院在國防部、經濟部、科技部指導下，投入金屬積層製造及應用技術開發，本院具備從粉末自製、設計、分析、製作、檢測、驗證等金屬積層製造全製程能量，可應用於國防/航太金屬零組件製作，符合航太級材料使用標準。積層製造適合快速製造少量多樣的零件，具體可應用於降低產品研發時間及成本問題，相關研發成果可透過技術合作技轉至民間廠商。

Under the guidance of MND, MOE and MOST, NCSIST involved in production and application development of metal additive manufacturing (AM). Throughout the full processing from powder production, AM design, simulation analysis, parts fabrication, to quality verification, NCSIST have established the core technologies of metal AM. The product properties meet the aerospace material specifications. AM has made breakthroughs for traditional manufacturing processing. AM is not only suitable for rapid production of small-batch and high-diversity low-quantity parts, but also shorten the timeline and cost of R&D. The development achievements of AM can be transferred to manufacturing industry through technological collaboration.

規格(中/英)

設備 Equipment	CS120s	CS250s	M400
工作區域 Build envelope	100x100x100 mm^3	250x250x300 mm^3	400x400x400 mm^3
雷射 Laser type	200W或500W光纖雷射 (擇一) 200W or 500W fiber laser (option)	500W光纖雷射 500W fiber laser	1000W光纖雷射 1000W fiber laser
腔體環境 Environment	惰性氣體(N_2/Ar)環境，氧氣濃度低於100 ppm N_2/Ar environment, O_2 concentration below 100 ppm		
材料 Materials	鎳基超合金718、不鏽鋼17-4PH Inconel 718, stainless steel 17-4PH		64鈦 Ti-6Al-4V

研發成果及應用(中/英)

金屬積層製造工件經全製程處理，其機械性質可符合國防及航太產業規格。(17-4 PH 析出硬化型不鏽鋼成品符合AMS-5355J標準、718鎳基超合金成品符合AMS-5662標準、鈦64成品符合AMS-4965標準)

The mechanical properties of the AM products meet aerospace material specifications. For instance, stainless steel conforms to AMS-5335J; Inconel 718 conforms to AMS-5662; Ti-6Al-4V conforms to AMS-4965.

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