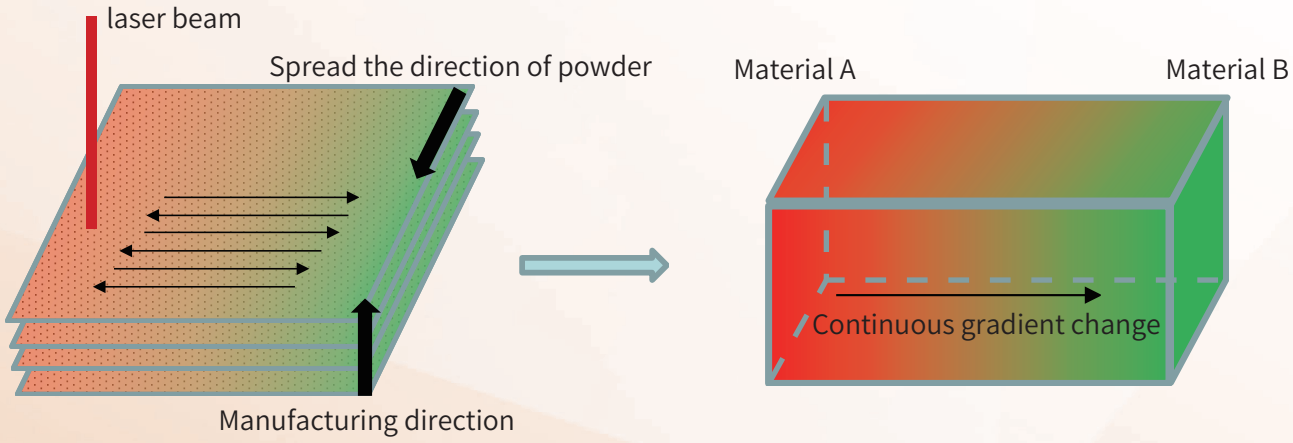
Selective Laser Melting (SLM) for Gradient Metal Printing

The company has independently developed and launched SLM (Selective Laser Melting) metal printing equipment such as the AFS-M120/M400, gradient metal equipment like the AFS-M120X(T), and multi-material additive and subtractive equipment such as the AFS-M300XAS. It has completed the forming and process development of materials including stainless steel, titanium alloy, aluminum alloy, mold steel, cobalt-chromium alloy, and nickel-based alloy. Among these, the gradient metal printing equipment AFS-M120X(T) is suitable for the performance research and development of composite metal materials, capable of achieving precise continuous gradient powder feeding of two or more different metal materials. It has horizontal and vertical gradient change directions, reducing process complexity, saving powder raw materials, and improving R&D efficiency. It has broad application prospects in the development of new materials for high-throughput material preparation, aerospace, automotive, medical, and mold processing fields.

Horizontal/Vertical Gradient Functionality

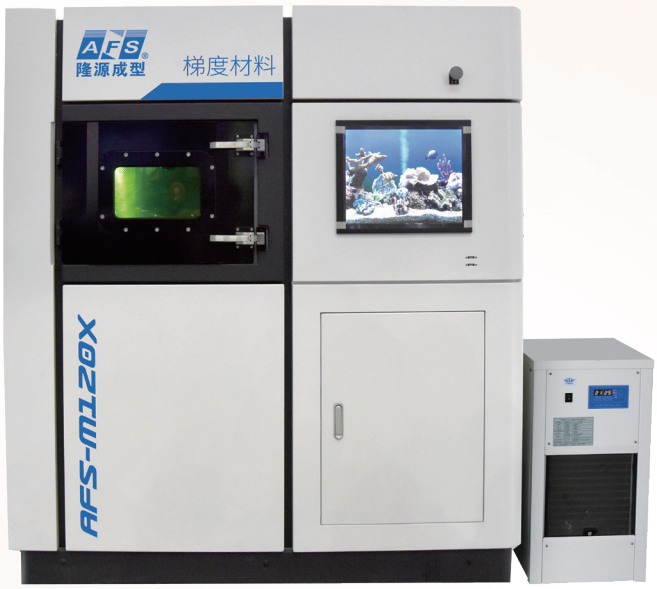
- The equipment is particularly applicable for studying and developing theproperties of composite metallic materials.
- The powder feeding system can achieve precise continuous gradient feeding of two or more different metallic materials. It has both horizontal and vertical gradient directions, which reduces process complexity, saves powder raw materials, and improves R&D efficiency.
- It can achieve gradient variation of two materials in the horizontal direction, enabling the preparation of gradient materials with full proportion variation of two phases.
- The forming precision is high, allowing for macroscopic identification of the gradient ratio on the manufactured material.
- By changing the powder storage structure, it is possible to manufacture gradient alloys with customized proportion variations.

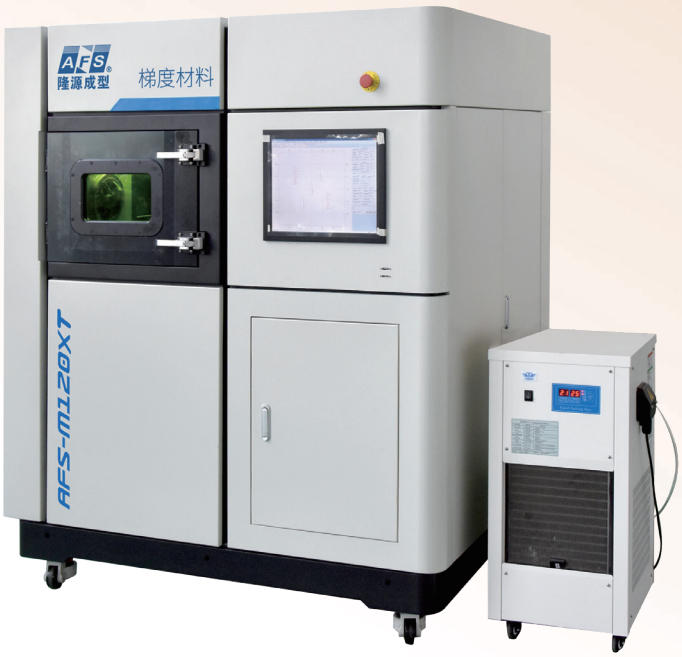
A Schematic representation of the two-phase gradient material preparation



3DPTEK

Selective Laser Melting (SLM) for Gradient Metal Printing AFS-M120X(T)

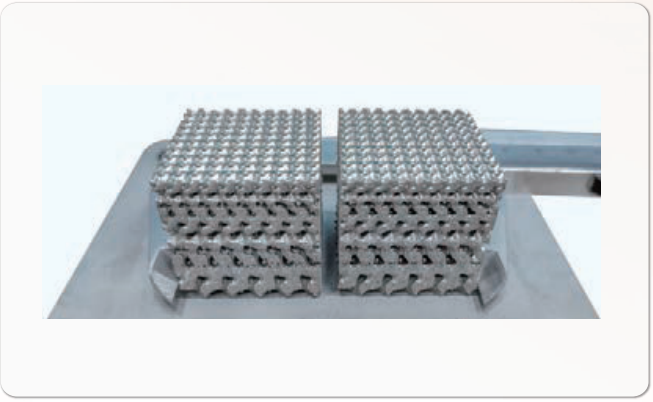


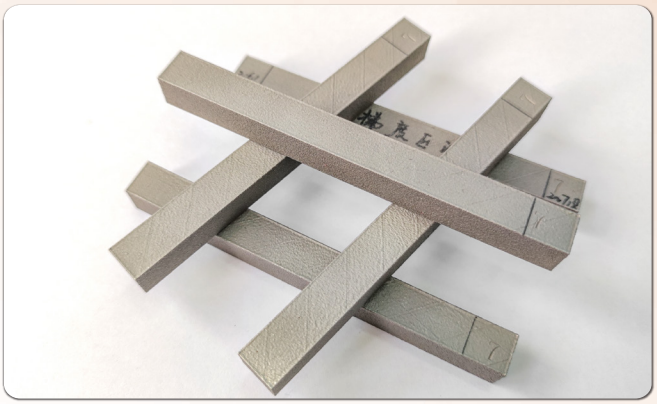


Equipment Parameters

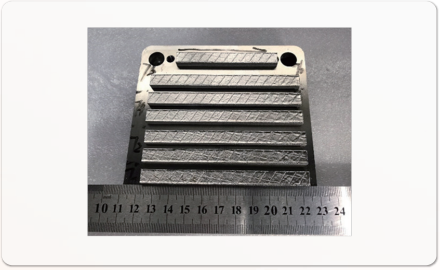
Unit Type	AFS-M120X	AFS-M120XT
Gradient Function	Horizontal gradient	Horizontal gradient + vertical gradient
Dimensions (L×W×H)	1532×1390×1830 mm	
Build Tank Dimensions (L×W×H)	120×150×150 mm	
Laser Type	IPG fiber laser, 500W	
Form. Accuracy	±0.1 mm/100mm	
Form. Speed	2-20 cm^3/h	
Layer Thk.	0.02-0.1 mm	
Max. Scan Speed	6 m/s	
Powder Particle Size	15-53μm	
Worktable Repeatability	±5μm	
Form. Mat.	Stainless steel / titanium alloy / aluminum alloy / die steel / cobalt-chromium alloy / nickel-based alloy, etc	
Control Program	AFSWin V8.4	
Data Format	STL	
Eqpt. Weight	≈1.5t	
Amb. Temp.	18-25°C	
Amb. Hum.	⩽60%	
Power Supply	380VAC / 50 HZ / 8KW Three-Phase Five-line	
Gas Supply	Gas Pressure 0.6~0.8Mpa, Fow Rate ⩾1.0m^3 / min, Clean and Dry gas Supply	

Application Cases

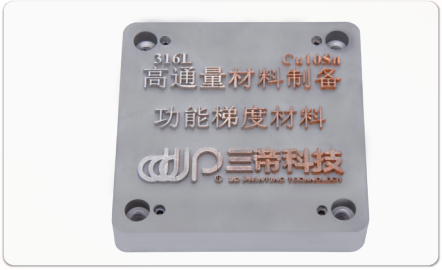




316L Stainless Steel-In718 Alloy Continuous Gradient Alloy

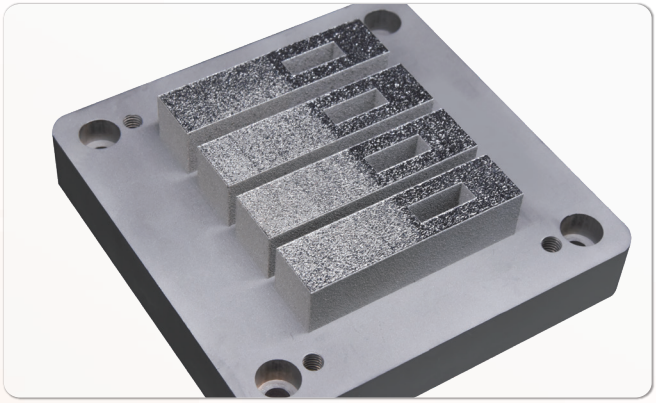


Ti-Ta Continuous Gradient Alloy



316L Stainless Steel-Cu10Sn Bronze Continuous Gradient Alloy

1.2709 Mold Steel-316L Stainless Steel Continuous Gradient Alloy



316L Stainless Steel-CoCrMo Alloy Continuous Gradient Alloy

Official Website

www.3dptek.com