

虛擬主軸單點金剛石加工系統 在包裝防及保安方面的應用

Virtual Spindle Single Diamond Turning System for Anti-counterfeiting and Security Packaging

用於非連續微光學結構陣列加工的低成本系統

A low-cost system for generating discontinuous micro optics arrays

虛擬主軸單點金剛石加工方法通過在垂直於物理主軸軸線的平面上結合兩組平移軸運動，從而虛擬出中心旋轉軸線。只要控制虛擬旋轉軸線穿過微陣列的所有元件，便可建構大規模的陣列微結構。

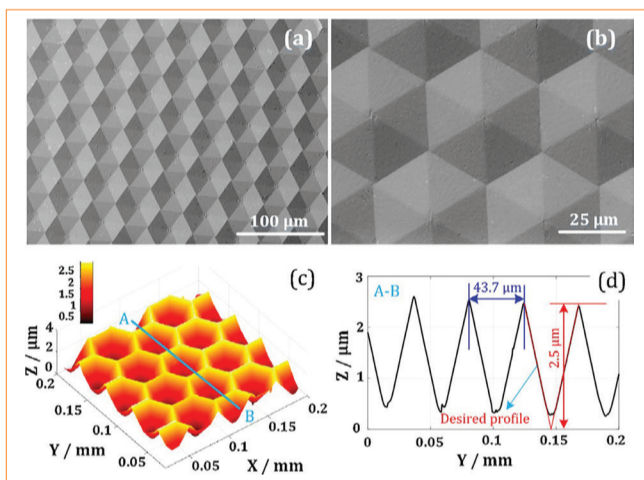
具有虛擬旋轉軸線的金剛石加工系統可在平面和曲面上，製造出小至幾十到幾百微米的非連續微光學結構陣列。加工後的特殊微光學結構可作貴重商品、奢侈品甚至鈔票的防偽特徵，也可令部分金屬表面產生多彩效果。

特色與優點

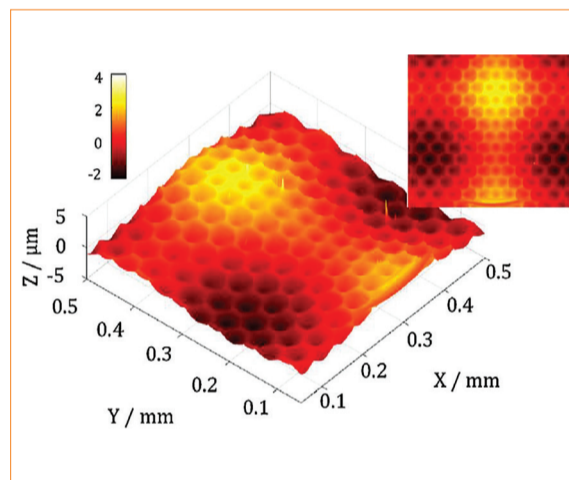
- 容易安裝，對快、慢刀伺服系統同樣適合
- 應用範圍廣，精度高
- 可在平面和自由曲面上進行光學微結構加工
- 可結合模具技術應用於防偽包裝及保安方面

應用

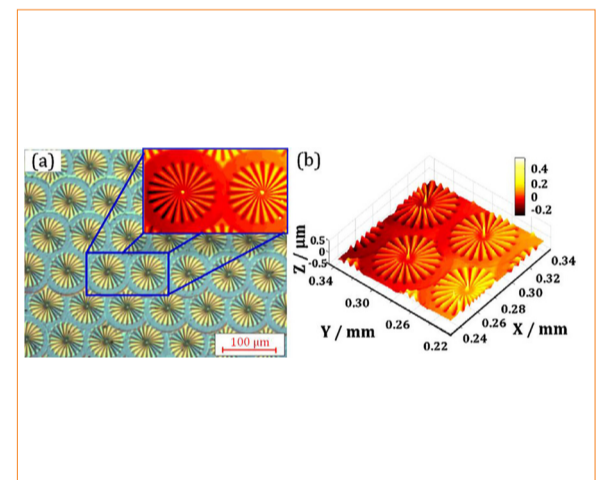
- 適用於產品的防偽包裝及保安方面
- 在金屬（如鋁合金、銅合金等）表面形成多彩特徵
- 按不同的要求量身訂製光學微結構模芯



平面上的非連續微光學結構
Discontinuous micro optics structure on the planar surface



自由曲面上的非連續微光學結構
Discontinuous micro optics structure on the freeform surface



平面上的定制化非連續微光學結構
Tailor-made discontinuous micro optics structure on the planar surface

This method virtually constructs a rotation axis through the centre by combining the two translational servo motions on the plane which is perpendicular to the physical spindle axis. Through controlling the virtual spindle axis to pass through centres of all the microstructure cells, large-scale arrayed microstructures can be obtained.

Applying this virtual spindle on diamond turning system can fabricate discontinuous micro optics arrays on both planar and freeform surfaces.

The discontinuous structure arrays scale is from tens of micrometers to hundreds of micrometers, even some special structures, e.g. 3D pattern, can also be fabricated. The micro structures can be applied to some valuable products, luxury goods or even bank notes in their security features, and generating multicoloured effects on some metal surfaces.

Special Features and Advantages

- Easily setup and applied to fast or slow tool servo systems
- With a wide range of applications and high precision
- Capable of generating optical microstructure on planar or freeform surfaces
- Capable of applying to anti-counterfeiting and security in packaging if combined with mold technology

Applications

- Anti-counterfeiting product packaging and security applications
- Production of multicoloured features on metal surfaces (such as aluminum alloy, copper alloy, etc.)
- Creation of customized optical microstructures cores tailor-made to different requirements

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