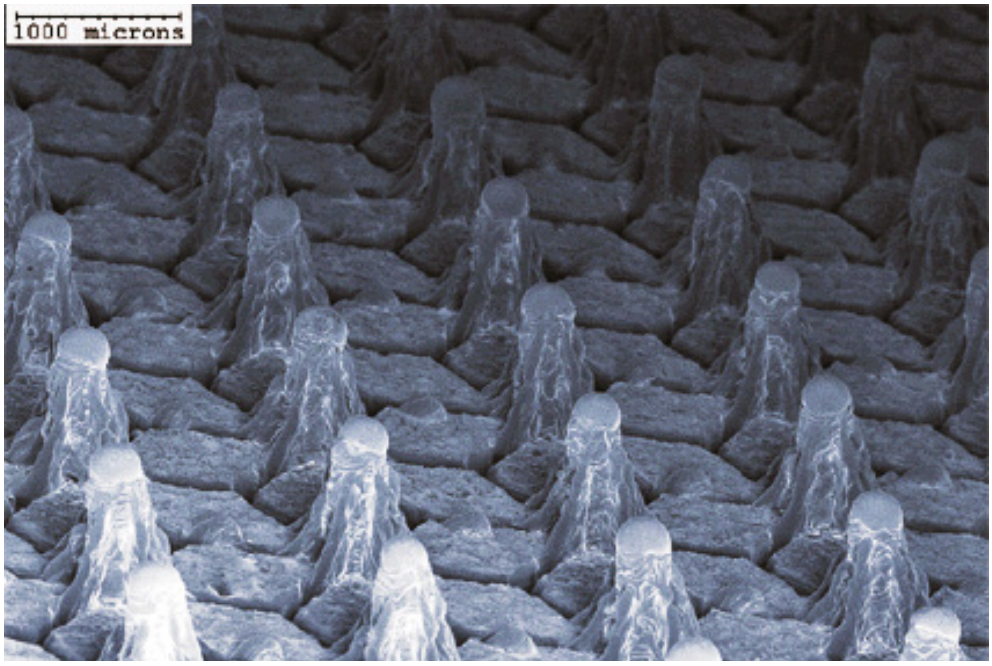
CAMBRIDGE VACUUM ENGINEERING

CVE Advanced Technologies
SURFI-SCULPT

Materials processing technology

Surface modification using an electron beam

Industrial applications



What is Surfi-Sculpt?

Surfi-Sculpt™ is a materials processing technology that manipulates an electron beam to modify surface textures so that they are more useful and efficient in industrial applications – such as for enhanced bonding of composites to metal.

With the ability to create a variety of hole and slot patterns Surfi-Sculpt is applicable to a wide range of projects and materials.

Computer software controls the location of the beam precisely and repeatably, making it a suitable process for manufacturing high-volume and value components, with the capacity to form several hundred features in less than ten seconds.

The process is highly flexible, offering the opportunity to design customised features in most industries, including medical, adhesive, and hydrodynamic applications.

Surfi-Sculpt works by melting substrate material using the heating action of the beam and then displacing material using the combined effects of temperature-variant surface tension and vapour pressure at the point of action of the beam. This process is repeated or overlapped to give the desired features.

A gallery of applications can be found on the reverse.
Surfi-Sculpt is a trade mark of TWI Ltd.

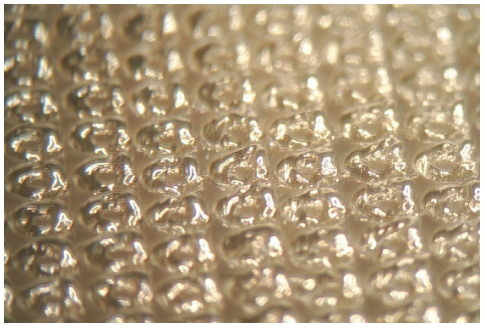


Figure 1. Ultra-coarse surface.

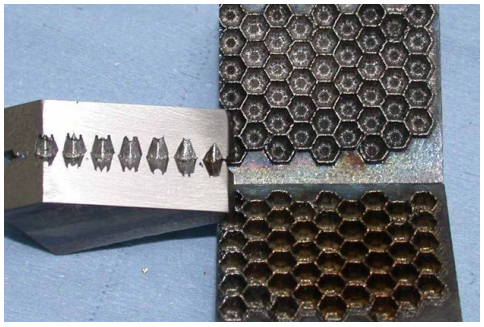


Figure 2. Honeycomb surface.

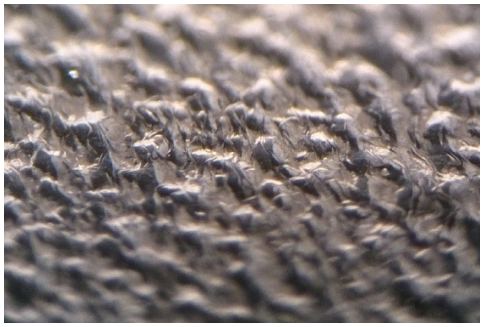


Figure 3. Ultra-light surface.

Applications

Biomedical Industry: Orthopaedic Implants

Surfi-Sculpt can increase bio-functionality for implants and devices – such as orthopaedic bone implants – by direct processing or by treatment of moulds.

This allows for design improvements, including implant fixation, product consistency, and successful integration.

Figure 4. Orthopaedic implants.

Manufacturing: Rotational Symmetry

Many parts of common products, such as handles or axles, have rotational symmetry.

Internal or external screw threads can be added using Surfi-Sculpt, as well as criss-cross patterns for an enhanced grip.

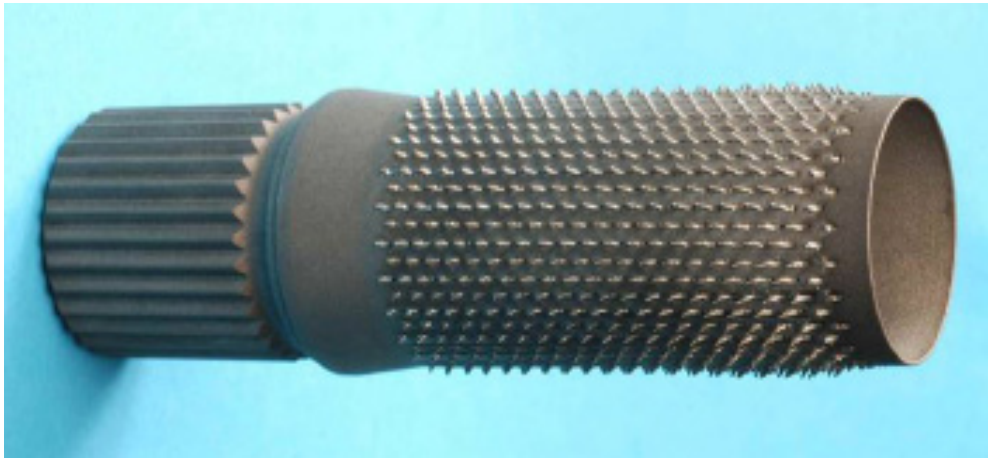


Figure 5. Rotational symmetry.

Materials Science: Surface Coatings

Surfi-Sculpt can manipulate surfaces to promote adhesion between a substrate and a coating (right). This could be taken advantage of in several industries including aerospace, medical, and automotive.

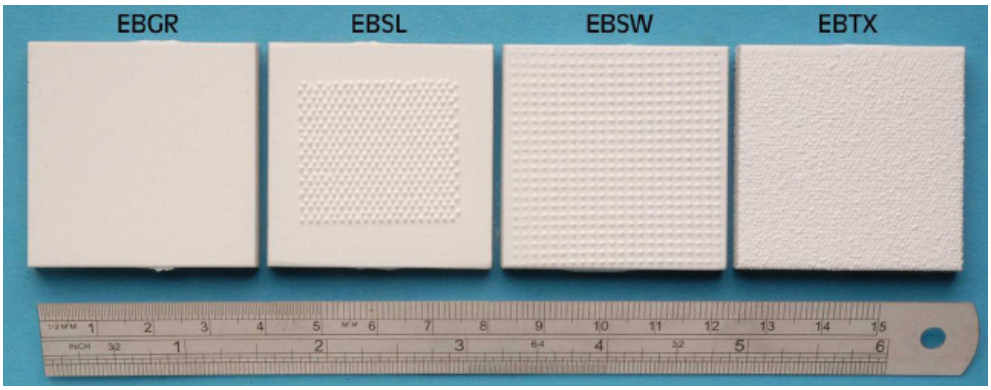


Figure 6. Surface coatings.

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