Auxetic Materials and Conversion Process

The Invention

Auxetics are materials and systems which exhibit the very unusual properties of becoming wider when stretched and narrower when squashed, that is, they have Negative Poisson's Ratio. A team of University researchers have extensive expertise on materials possessing auxetic properties and how they can be used to develop and manufacture new or improved commercial structures and products. They have also developed a novel way of converting conventional foam to auxetic foam through the use of solvent instead of heat.

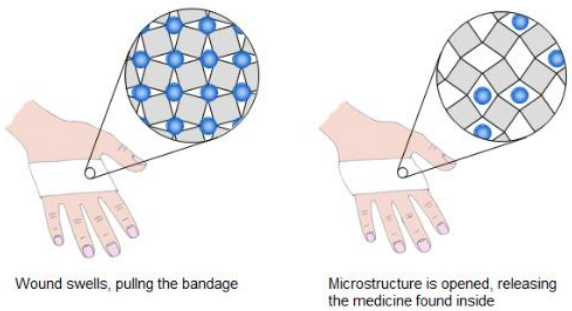
Novelty

Apart from possessing a Negative Poisson's Ratio, auxetic materials display additional unique qualities such as increased shear stiffness, an increased plane strain fracture toughness and an increased indentation resistance. When an object hits an auxetic material and compresses it in one direction, the material contracts laterally. That is, material flows into the location of impact creating a denser material which is less resistant to impact.

Auxetic materials are also known to have better shock and vibration absorption properties. They also have a natural tendency to form dome-shaped double-curved surfaces, unlike conventional materials which tend to form saddle-shaped surfaces. Such materials are particularly desirable in applications that require highly curved hard surfaces, such as certain contours of the human body

Application Fields

- Hierarchical kink-less stents
- Skin grafting
- A bandage made from an auxetic microstructure impregnated with a healing drug.
- Implants and dressings to adapt to body contours
- Novel mattresses which reduce the incidence of bed sores



Wound swells, pulling the bandage

Microstructure is opened, releasing the medicine found inside

The development was executed at and supported by the University of Malta, sole owner of the rights. The university's IP is managed by its Knowledge Transfer Office. Inquiries shall be submitted to knowledgetransfer@um.edu.mt, or further information may be obtained on +356 2340 3466.

IP Status

Patent granted under number GB2480905 B in July 2013 (United Kingdom). Patent number MT4236 was also granted in Malta.

Commercial Interest

We are interested in collaborating with entities to design smart materials.

Lead Inventor

Prof. Joseph Grima

Dr. Ruben Gatt

Dr Daphne Attard