Shaping the future -- from sleep to air travel

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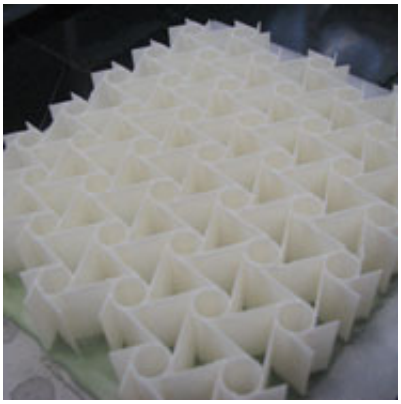

CHISMACOMB, (CHIral SMArt honeyCOMB)

Imagine airplane wings that can change shape in mid-air or a material that can curve, bulge or twist without the need for expensive and heavy motors or hydraulics. Imagine a material that gets thicker when stretched, unlike conventional materials that get thinner – a substance that could be used in anything from a mattress to an airplane. The implications are enormous.

Now, thanks to a new European Union-funded project CHISMACOMB (CHIral SMArt honeyCOMB), led by University of Bristol researchers, this innovative new technology is set to make this a reality.

The project has developed an auxetic, honeycomb-structure material which becomes thicker when stretched, allowing greater flexibility without compromising strength.

The technology can be used in sandwich structures, whereby the material is inserted between layers of another material such as carbon fibre. These sandwich structures are widely used in the civil, naval and aerospace construction, and in industries using electromagnetic shields.

The University has also applied the technology to aircraft wing design where promising results have shown that the wings may bend, twist, shrink and expand to continuously optimise their aerodynamic properties during flight, resulting in lower noise and potentially much lower carbon emissions.

These radical new materials are also giving marine designers the step change needed to improve the sandwich structures in mine-hunting ships, and in the decks and joints of pleasure boats.

Dr Fabrizio Scarpa, project leader and Reader in Engineering in the Department of Aerospace Engineering at the University, said: “These materials offer exciting new possibilities and change the nature of how composite materials, in particular carbon fibre cellular structures, can be used to gain even greater advantages from them.”

Source: University of Bristol