Electro Active Polymers (EAPs)

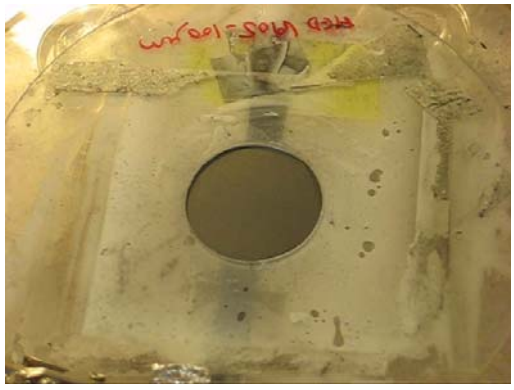
The Micro and Nanotechnology Centre (MNTC) at the Rutherford Appleton Laboratory (RAL) are involved in research looking at the application of actively variable microstructures in boundary layer control over wing surfaces. This group is also tied in to a network of Universities who are actively involved in aero-research. These materials can also be made ice-phobic.

Electro Active Polymers are polymers that undergo shape change when a voltage is applied to them. Although the first EAPs were discovered in the 1960's only recent advances in materials have made the magnitude of the changes and the efficiency practical. There are four main types of EAP, the last of which is the main type STFC are working with:

- Piezoelectric
- Ionic
- Electrostrictive
- Dielectric elastomers

The Micro and Nanotechnology Centre (MNTC) at the Rutherford Appleton Laboratory are not only involved in the use of EAPs but they are also working with these materials for boundary layer management and flow separation at the microscale on **aircraft wings**. Actively variable structures combined with sensors using the same EAP principle in reverse could help in delivering the quest to reduce the CO_2 emissions in air transport of the future. Using ice-phobic versions of these materials at larger length scales offer the ability to solve multiple problems using the same technology. Intelligent design and optimisation of structures mean that EAPs can also be used for seamless actuators and warping structures.

Preventing ice build up on wings



Aerodynamic dimples

For further information, please contact **Andy Bennett** or **Paul Vernon**
Tel: 01925 603193 and 01925 603141 Email: technicalsales@stfc.ac.uk

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