

Study shows new body armour can benefit from nanotechnology

Research at CCLRC Daresbury Laboratory has shown that incorporating nanoparticles into body armour can make it lighter, more flexible and more effective.

Current body armour relies on a stiff and relatively heavy layer of ceramic material to absorb ballistic impact. This makes body armour heavy and unwieldy. The Daresbury team, together with researchers from Tuskegee and Florida Atlantic universities in the USA, are evaluating new nanocomposite materials which can be woven into fabrics to provide greater flexibility as well as better ballistic protection. They have found that incorporating spherical nanoparticles of silicon or titanium dioxide or carbon nanotubes in a plastic or epoxy matrix offers improved ballistic resistance together with greatly improved flexibility.

Daresbury Laboratory's role has been to investigate ways to make the new materials as strong as possible. The manufacturing process used to make the new body armour can introduce impurities which limit the amount of nanoparticles that can be incorporated and so reduce its effectiveness.

Dr Vin Dhanak said, "We're using the synchrotron light source, or SRS, and the photoelectron spectrometer at the National Centre for electron spectroscopy and surface analysis, both based at Daresbury. These world-leading instruments let us analyse how the nanoparticles bond with the matrix materials in which they're embedded. This will help improve the manufacturing process to eliminate impurities and make the materials stronger."

Source: Council for the Central Laboratory of the Research Councils

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