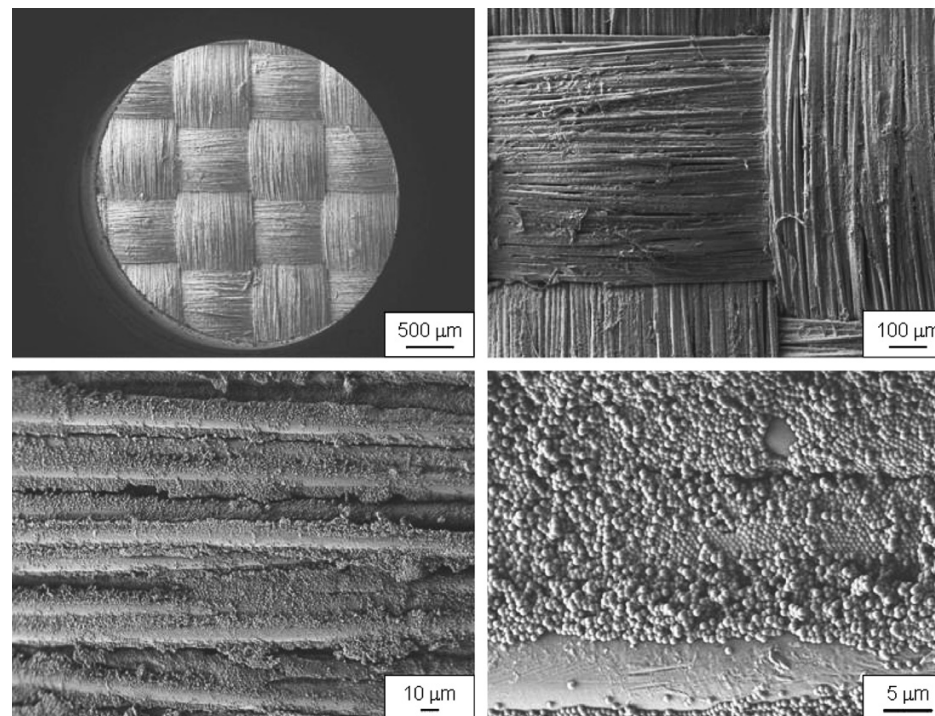


## Liquid Body Armor

Researchers at the University of Delaware and the U.S. Army Research Laboratory have developed a new material called Liquid Body Armor. Liquid Body Armor is created by saturating traditional Kevlar, a protective fabric commonly used by police officers and soldiers, with a special shear thickening fluid of nano-sized silica particles suspended in polyethylene glycol. Shear thickening fluids (STFs) display non-Newtonian behavior, similar to Oobleck. In a liquid state, the tiny silica particles stay evenly separated in the mixture due to a weak molecular repulsion. If the saturated Kevlar is forcefully hit or punctured, the energy of the sudden impact overrides the molecular repulsion and forces the particles into small groups called hydroclusters. The hardening process occurs in milliseconds, but once the force is removed the material returns to its original flexibility. Still in the experimental phase, STF-treated fabric could replace military flak jackets or be used for prison guard uniforms. Other companies are also using STF-treated fabrics to make personal protective equipment such as ski hats, football pads, point shoes, and motorcycle jackets.



Scanning Electron Microscope image of STF treated Kevlar