

FLUORINE-FREE REPELLENCY OPTIONS FOR CBRN PROTECTIVE GARMENTS

Problem

Current Chemical Biological Radiological Nuclear (CBRN) Medium Protective Ensemble garments used by the Australian Defence Force (ADF) utilise a PFAS fluoro-surfactant coating to provide liquid repellency from water, petroleum, oils and lubricants (POLs), and Chemical Warfare Agents (CWAs). PFAS chemicals are coming under increasing scrutiny around the world for their environmental and likely health effects. The future use of PFAS fluoro-surfactants will likely be prohibited or severely restricted.

Need and relevance to Defence

Defence has an ongoing requirement to provide individual protective equipment to ADF personnel in order to operate in a CBRN-contaminated environment.

Research question

What are viable fluorine-free alternatives to deliver liquid repellency for future CBRN protective garments?

Expected outcomes

Novel approaches to providing fluorine-free liquid repellency against CWAs will have been explored. Approaches that are judged to be scalable or readily incorporated into industry will be viewed favourably.

Methodology/approach

CBRN garments are made from air-permeable fabrics, and the air permeability must be maintained. Required repellency could be delivered via a coating applied to the textile fabric, or changes in the morphology of fibres used to construct the fabric layer. The

research organisation(s) will be expected to assess their repellent fabrics against a range of parameters including contact angle, indicative durability (wear/rub, wash), thermal burden, and air permeability, as well as repellency against a specified list of chemicals as proposed by Defence. Promising approaches may be assessed in-house at DSTG against CWA.