TBIS

Topic of the Speech:
Enhancing Thermal Management in Protective Textiles Using Hydrated Salt as Phase Change Materials

Dr. Danmei Sun
School of Textiles and Design
Heriot-Watt University
UK

Dr. Danmei Sun is an Associate Professor in Advanced Textile Materials & Engineering at the School of Textiles and Design, Heriot-Watt University. She comes from a textile industry background as a textile engineer for over 10 years before becoming an academic in 2018.

Dr Sun's research interests lie in the areas of functional fibres/filaments for protective textile and clothing systems, eco-friendly printing and dyeing, understanding material properties through Finite Element Analysis, etc. Her research activities are supported by various research projects that are funded by government funding bodies such as UK Dstl/MoD, Oil & Gas Innovation Centre, Scottish Funding Council, EPSRC, and AHRC, and company partners such as Harris Tweed, Iron and Ocean Ltd., etc.

ABSTRACT SUBMISSION
-FOR INVITED SPEAKER ONLY

Enhancing Thermal Management in Protective Textiles Using Hydrated Salt as Phase Change Materials

Danmei Sun[1], Kashif Iqbal[2], Muhammad Owais Raza Siddiqui[3]*
[1]School of Textiles and Design, Heriot-Watt University, Galashiels, TD1 3HF, UK
[2]Department of Textile processing, National Textile University, Faisalabad-37610, Pakistan
[3]Department of Textile Engineering, NED University of Engineering & Technology, Karachi – 75270, Pakistan
[*]Presenter's email: d.sun@hw.ac.uk

ABSTRACT (NO MORE THAN 500 WORDS:)

The thermal properties of textiles are crucial in determining the comfort of both textile and clothing systems. Phase change materials (PCMs) containing latent heat, play a significant role in this regard. When the temperature of the surroundings changes, PCMs either melt by absorbing heat from environment or solidify by releasing its heat to the environment. During the melting and crystallising processes, the temperature of the PCM remains constant. By incorporating appropriate PCMs, garments can maintain a relatively stable temperature within the micro-environment between the garment and the wearer. The efficiency would rely on the amount of PCMs used. In this research, a type of novel nano-capsule containing PCM Glauber's salt was synthesised and tested. Techniques such as Differential Scanning Calorimetry (DSC), Electron Microscopy (SEM), FTIR etc. were used to examine the developed Nano capsules. A finite Element model has been developed that was used to better understand the thermal mechanisms of PCM incorporated textiles. By providing a comprehensive analysis, this paper aims to advance the application of PCMs in protective textiles, contributing to the development of next-generation materials that offer thermal regulation and wearer protection.