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Advanced Textiles for Soldier Clothes Based on Coordination Polymers

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Abstract : The functional textiles development history in the military field could be ascribed as a uniquely interesting research topic. Soldiers are like a high-performance athletes, where monitoring their physical and physiological capabilities is a vital requirement. Functional clothes represent a “second skin” that has a close, “intimate” relationship with the human body. For the application of textiles in military purposes, which is normally required in difficult weather and environmental conditions, several functions are required. The requirements for designing functional military textiles for soldier's protection can be categorized into three categories; i) battle field (protection from chemical warfare agents, flames, and thermal radiation), ii) environmental (water proof, air permeable, UV-protection, antibacterial), iii) physiological (minimize heat stress, low weight, insulative, durability). All of these requirements are important, but the means to fulfill these requirements are not simple and straight forward. Additionally, the combination of more than one function is reported to be very expensive and requires many complicated steps, and the final product is found to be low durability. Not only do all of these requirements are overlapping, but they are also contradicting each other at various levels. Thus, we plan to produce multi-functional textiles (e.g., anti-microbial, UV-protection, fire retardant, photoluminescent) to be applied in military clothes. The current project aims to use quite a simple and applicable technique through the modification of textiles with different coordination polymers and functionalized coordination polymers.

Keywords : functional textiles, military clothes, coordination polymers, antimicrobial, fire retardant, photolumenscent
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