Intelligent multi-reactive textiles integrating nano-filler based CPC-fibres

From 2006-09-01 to 2010-08-31

Objective

The overall objective of the INTELTEX project is to develop a radically new approach to obtain intelligent textile combining three innovative functions: measurement in a continuous way of mechanical stresses applied to the textile structure, thermal self regulated textile surfaces, and detection of toxic volatile solvents.

This multi-sensitivity will be ensured by the integration of Conductive Polymer Composite (CPC) in textiles fibres. CPC, that is obtained by dispersion of conductive particles in a non-conductive polymeric matrix, is a material whose electrical conductivity changes depending on external stresses such as temperature, strain and vapour atmosphere. By processing textiles structures integrating CPC-based fibers, it will be possible to get multi-reactive textiles where the complete textile act as sensor.

This new multifunctional textile will be used for many important applications with customised properties tailored to the following applications: Building application: wall fabric to detect cracks and temperature changes; industrial floors for leakage control and volatile solvent detection / Medical application: medical wear for monitoring body temperature / Protective clothing: combination of the three functionalities in fire-man clothing: monitoring near skin temperature, exterior temperature, mechanical stress (detection of an impact) and toxic volatile solvents such as carbon monoxide in fire.

INTELTEX offer radical innovations in 2 areas:
- Textiles area: development of a CPC-based technical functional textile combining 3 innovative functions mentioned above.
- Materials and nanotechnology area: development of stable carbon nanotube based multiphase CPC by controlling at nanoscale level the dispersion of carbon nanotubes.

The inter-particle gap is indeed a key-factor to get spinable CPC with the desired electrical properties.
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