



Environmentally friendly,  
supercritical CO<sub>2</sub> aided deposition  
of

# electrically conductive polymer coatings

## Problem

Electrostatic charge buildup is a major problem in many applications involving electrically insulating polymeric materials.

## Invention

VTT has developed a novel type of polymerization process where a polymeric substrate of any form (fiber, particle, film, bulk) is treated with reagents that yield a durable surface layer of electrically conductive polymer. The process utilizes liquid and supercritical carbon dioxide (scCO<sub>2</sub>) as solvent and is therefore environmentally favourable.

## Solution

In the semi-batch process the polymeric substrates are embedded in stirred pressure vessel and first impregnated by the monomer-carbon dioxide binary mixture. Examples of suitable monomers are pyrrole, aniline and thiophene derivatives. In the second step the excess monomer is separated and collected. The monomer-impregnated, scCO<sub>2</sub>-swollen substrates are subsequently exposed to CO<sub>2</sub>-oxidant (possible co-solvent) mixtures that induce the surface polymerization. Monomer residues and other soluble polymerization by-product can be effectively removed by scCO<sub>2</sub> extraction.



## Why partner with VTT?

### 10 reasons for technology partnering with VTT

1. Key factor in Finland's success story with a track record to prove it
2. Licensing and co-venturing opportunities
3. Portfolio of more than 1,000 patents and inventions
4. New business and product concepts based on strong IP and world class research
5. Combined experience of more than 2,000 motivated researchers in eight focused areas of technology
6. Active member in hundreds of scientific & business communities
7. Excellent track record as coordinator and partner in EU projects
8. Collaboration with TOP 50 R&D companies in Finland
9. Global R&D partnership with 50 Fortune 500 companies
10. Market driven multi-disciplinary solutions

## Additional information

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