Fluoropolymer surface coating technology

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Abstract

An Estonian SME has developed fluoropolymer surface modification and coating method. Fluoropolymers are unique materials because of their chemical, physical and biological stability, but their extremely hydrophobic surfaces impede attachment of any additives. The patented functional catalysts and methods for chemical modification of the surface of fluoropolymers can be applied in a number of areas (construction, aerospace/military, fuel cells etc). Partners for further development are sought.

Description

Ongoing developments demonstrate that the company can develop a wide range of novel materials with exciting properties based on their innovative methods. The main objective of the offer is to develop a scale of different applications where the SME's fluoropolymer surface modification/coating methods could be used based on actual needs of related industries.

The fluoropolymer coating method consists of following principle steps:
- Special chemical modification of fluoropolymer surface
- Applying neccesary layers on fluoropolymer surfface
- Applying necessary functional components on the layers

Special mixtures that can be applied on fluoropolymer surfaces can be provided by the Estonian SME, for example these mixtures could be applied on fluoropolymer film in roll-to-roll production line for the film surface modification. But exact treatment of any specific application could differ and may require special development work.

The fluoropolymer surface modification and coating method opens doors for improving the quality of fluoropolymer coatings in conventional areas significantly (e.g. in construction industry) and using fluoropolymer coatings in new application areas.

The Estonian SME is seeking cooperation partners with specific technical, R&D and marketing expertise of different application areas who are interested in co-developing certain applications or have a specific technical need that could be fulfilled using the coating method.

Innovations and advantages of the offer

The method enables to modify and coat fluoropolymer surfaces with layers of different functional chemicals.

Unique qualities of the SME's fluoropolymer surface modification and coating method are:

- Can be applied on PVDF (polyvinylidene fluoride), PTFE (polytetrafluoroethylene) and other known fluoropolymers
- Extreme bonding strength (chemical bonds are created between fluoropolymer and surface layers)
- The initial characteristics of the fluoropolymer material remain the same (the material is not mixed with any other substance or resin)
- There is no need for physical, plasma or thermal treatment of the fluoropolymer before grafting. All sizes and shapes of materials can be treated.
- The fluoropolymer can be coated with any necessary material layer (other plastic, metal, functional groups, inorganic crystal layer etc) and various monomers can be used to create a functional layer
- Thickness and structure of the applied layer can be strictly controlled

Current and Potential Domain of Application

-Aerospace/Military
-Automotive
-Shipping
-Catalyst fillings for columns
-Fuel cells (fluoropolymer gas separators)
-Microfilters (combining microfilters and functional testing materials)
-Depositor films
-Biodepositors
-Tester films with different electrical potential
-etc.

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