

TECHNOLOGY TRANSFER OFFICE

UNIVERSITY OF COLORADO

Imidazolium-based Polymers as Anti-Static Material

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Background

Anti-static agents are added to materials in order to reduce or eliminate buildup of static electricity. This is accomplished by making the surface of the treated material slightly conductive. Anti-static agents can either be incorporated into a material or can be applied to the surface.

Anti-static materials have countless applications. They are used in everything from textiles to auto parts, electronic equipment, and packaging. For safety, anti-static materials are used in hospital operating rooms and high oxygen environments. The use of anti-static materials improves the operation of many parts and devices.

Common antistatic agents are long chained molecules with a hydrophobic and hydrophilic ends, like a surfactant. Often antistatic agents are based on long chain ethoxylated aliphatic amines and amides, quaternary ammonium salts, or other corrosive agents. Others are conductive polymers, used as external anti-static agents.

Some anti-static agents are liquids which makes their application difficult, decreases their thermal stability, and can decrease purity. Solid anti-static materials are often very expensive and are opaque, limiting their use in optics. Their solid nature gives loss of physical properties like puncture resistance and heat sealability. Solid anti-statics can also be incompatible with host polymers.

Technology

A research team at the University of Colorado has developed a novel antistatic imidazolium-based ionic liquid polymer for surface application. This antistatic material has unique composition of matter that allows it to out perform many traditional antistatic agents. The counterions and compositions of the anti-static material can be changed at will to control properties of the material and the interaction with the host. This technology provides a higher loading of anti-static components than other anti-static materials and is much less corrosive. These anti-statics are non-leaching in the polymeric form. Their simple chemistry makes them industrially friendly, as the starting material is plentiful and inexpensive, and they are very inexpensive to produce. These materials can be thought of as solid which means there are fewer impurities in comparison to liquid antistatic materials. Also, this new anti-static can be optically clear, has higher thermal stability, and good heat sealing. This technology has a distinct advantage over traditional anti-statics for use in optics because it can be completely transparent. These anti-static agents can be used in any application where traditional external anti-static agents are used.

Components:

- Solid anti-static coating
- Optically clear
- High thermal stability
- Inexpensive