Conductive Polymer Nanocomposites Films

THE INVENTION

This invention is Poly Vinyl Alcohol (PVA) based nanocomposite films with different conducting fillers namely: Graphene, Starch, and Carbon Nanotube (CNT). The films can have different surface resistivity on top, middle and bottom surface.

MARKET NEED

Polymers have been known to be lousy electric conductors. Traditionally insulating polymer matrices were filled with conductive fillers to produce electrically conductive or anti-static material [1]. Modified polymer materials / films have found different applications including in semiconductor and electronics industry. However, there is always a room for improving the material properties for growing industry requirements and for new applications.

The global conductive electroactive polymers market is expected to reach USD 4.4 Billion by 2020, showing a CAGR of 7% between 2015 and 2020 [2].

[1] Article: Graphene filled polymer nanocomposites.

[2] Reuters.

APPLICATIONS

The unique properties of PVA polymers such as flexibility, ease of blending, resistance to temperature and electric properties combined with properties of graphene and CNTs gives the invented polymer films required functionality to fit for many important applications.

Based on different composition and resultant electrical resistivity obtained the films can cover wide range of applications such as:

- Electrical insulator or conductor
- Semiconductor
- Electrostatic discharge protection
- Electromagnetic field shielding
- Anti-static packaging such as anti-static bags to carry electronic hardware, antistatic garments such as gloves or shoes

ADVANTAGES

- Flexibility
- Economical (simple fabrication)
- Simple process compared to conventional Chemical Vapor Deposition (CVD)
- Environmentally friendly (PVA is a biodegradable and non-toxic material)

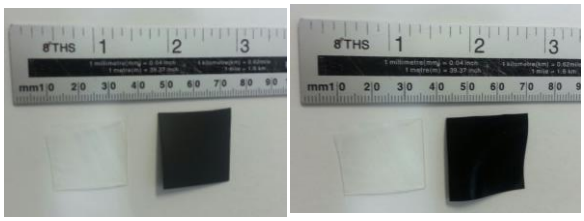

Figure: Samples of PVA nanocomposite films with graphene (Left) and CNT (Right).

PROJECT STATUS

PVA based nanocomposite films were prepared with different proportions of nano-fillers to enhance and control its conducting properties. The electrical surface resistivity was measured, for different samples with different nanomaterials loadings, showing a wide range. The films were produced and tested at lab scale.

NEXT STEPS

Testing the material for properties needed by industry and enhancing the material for potential applications.

King Fahd University of Petroleum & Minerals (KFUPM) seek an industry partner to develop the technology leading to commercial exploitation. Plastic producing companies are welcome.

PATENT PROTECTION

Patents US10049784 cover the composition and method of making the films. IP is owned by KFUPM.

For further information please contact:
Email: IP-License@kfupm.edu.sa