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A Review on Physical Properties and Wide-Ranging Applications of Conductive Polymers

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Abstract: *Polymer science was developed by industrial laboratories of international renown in order to produce and comprehend novel plastics, rubber, adhesives, fibers, and coatings. Polymer-nanoparticle composites are highly regarded by researchers due to their hybrid and synergistic characteristics. These substances demonstrate unique mechanical, electrical, optical, and thermodynamic characteristics whether in solution or in bulk. It is improved by nanoparticles, polymer-particle interaction, and dispersion. Additions of nanoparticles and polymers require less dosing than conventional additives. Light scattering caused by the reinforcement of microparticles diminishes optical clarity. Dispersion of nanoparticles and interfacial adhesion of polymers and particles serve to reduce scattering and produce films, coatings, and membranes that are both transparent and robust. The classification of polymers is based on their dimensions and physical composition. Size has a significant effect on the properties of polymers. Polymers, as opposed to metals and ceramics, consist of macromolecules. The weight average molecular weight of covalently bonded, long chain macromolecules governs their spin, blast, deep draw, and melt-formability. As an active material, nanostructured substances can produce superior devices. Currently, engineering, physics, chemistry, and biology conduct research into nanoscience and nanotechnology. Scientific and technological attention has been directed towards semiconductor nanoparticles due to their adjustable optical and electrical characteristics, as well as their potential applications in solar cells, light-emitting diodes, and bio-labels. This article discusses the properties and applications of polymer thin films.*

Keywords: Nanoparticles, Green Polymers, and Polymers