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ACTION OF INORGANIC PARTICLES ON THE CONDUCTIVITIES OF CONDUCTIVE POLYMER COMPOSITES

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Cellulosic nano-fiber (Cell-NF) with the diameter of less than 100 nm is a promising material for the improvement of the mechanical properties of the conventional polymers. When Cell-NF is added into the conductive polymer composites, it is expected to help the formation of networks of conductive polymer chains to enhance their conductivities. The authors have been studying the addition effect of cell-NF with the diameter of less than 40-50 nm and length of 2-3 μ m on the conductivities of the conductive polymer composites, which were prepared from a water-soluble conductive polymer (polyaniline sulfonic acid (PAS)) and water dispersible polyester (PEs) or water soluble polyvinyl alcohol (PVA) as a polymer binder with the use of wet type atomization machine. It was found that the Cell-NF had an effect on the conductivities of the PAS composites and the degree of the conductivity improvement was dependent upon the species of the polymer binder (PEs, PVA). The enhancement of the conductivity is possibly caused by the adsorption of PAS molecules on the surface of Cell-NF. The addition effect of Cell-NF and its action mechanism will be discussed in detail in this lecture.