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WATERBORNE POLYURETHANE-EXFOLIATED GRAPHITE OXIDE NANOCOMPOSITE: THE EFFECT OF FILLER CONTENT

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Conductive polymer composites containing conducting fillers have been extensively investigated in the past few decades, because they can be utilized in electromagnetic shielding, antistatic coatings, batteries, light emitting devices, and other functional applications. Nanosize conductive fillers, which have high conductivity and large aspect ratio, can make percolative network at an extremely low-often below 1 volume %.

Recently it has been reported that almost perfectly exfoliated material can be prepared from highly oxidized GO by the thermal expansion at high temperature. Because the completely exfoliated GO (CEGO) is composed of functionalized single graphene sheets having the polar functional groups that are remained even after thermal treatment, the CEGO has an affinity to polar solvents and polymers as well as good conductivity.

Waterborne polyurethane (WPU) coatings have received increased attention in recent coatings technology development because it evolves only water, not volatile organic compounds during the drying process. It can be utilized effectively in electronic devices as a coating for antistatic or electromagnetic shielding.

In this study, we prepared WPU/CEGO nanocomposites without any further treatment of CEGO as a new conductive WPU nanocomposite. The variation of conductivity and other physical properties of the nanocomposites by the added CEGO, and the morphology were examined.