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Towards an optimal nanotube dispersion for transparent conductive coatings MATTHEW GARRETT, University of Tennessee, ILIA IVANOV, BIN ZHAO, ALEX PURETZKY, DAVID GEOHEGAN, Oak Ridge National Laboratory — Thin films of carbon nanotubes have been investigated as a potential material for transparent conductive coatings. There is a range of transmission and resistance that must be met to make the film useful for technological applications, down to 10 Ω/Square at over 80%T. When nanotubes in solution are made into thin films, the electro-optical properties of the film is dependent on the method of dispersion of the tubes used to make the film, in addition to the quality of the starting material used to make the dispersion. At 90%T, the method of dispersion can cause nearly a factor of ten difference, 15000 Ω/Square, in the resulting film's resistance. Aggregates can cause scattering from the film, detracting from its transmission. The length and purity of the tubes affects the overall resistance of the film. The extent of tube bundling also plays an important role in the electro-optical properties of these films. Methods of quantifying the nature of tubes in solution can yield much insight into the quality of the film which will result from the solution. We have shown how a thorough characterization of the tubes during dispersion as well as after deposition is helpful in determining how to achieve the desirable attributes of a transparent conductive film of nanotubes.

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