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P1: Dispersion and Characterization of Boron Nitride Nanotubes Stabilized by DNA

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Abstract

Boron nitride nanotubes (BNNTs) are newly emerging nanomaterials with extraordinary mechanical properties as well as thermal and chemical stability. There have been growing interests in both fundamental studies and technological development of BNNTs such as protective coatings for high temperature and hazardous environments due to recent success in large scale synthesis of BNNTs. In this work, various DNA sequences were utilized to stabilize aqueous dispersions of BNNTs. First, we determined the optimum mass ratio of 1:1 for BNNTs:DNA using $(GT)_{20}$ by UV-vis absorbance measurements. Second, the DNA length effect on the dispersion yield of BNNTs was investigated using sequences $(GT)_3$, $(GT)_5$, $(GT)_{10}$, $(GT)_{15}$, and $(GT)_{20}$. Third, mononucleotide repeats of A_8, C_8, G_8, T_8 were used to examine the DNA sequence dependent behavior of BNNT dispersion yield and quality. In addition, various salt concentrations of 0, 50, and 100 mM NaCl was tested to evaluate the effect of salt on BNNT dispersion. We found that the BNNT absorbance remains relatively similar at the given salt concentrations.