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A Novel Approach to Align Carbon Nanotubes Via Water-Assisted Shear

Stretching

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Abstract

Floating catalyst chemical vapor deposition (FCCVD) can produce buckypaper, a kind of CNT film, at large-scale with low cost. However, individual CNTs in the buckypaper are mostly randomly oriented, which significantly limits their electrical and mechanical properties. Here we report an innovative approach, water-assisted shear stretching (WASS), which can significantly improve CNT alignments and consequently enhance the electrical and mechanical properties. In addition, we define a unique "alignment factor" to quantify the alignment degree, and to estimate the effect of alignment on the mechanical and electrical properties of CNT assemblies. The high mechanical strength

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