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DNA Sequence Motifs for Structure-Specific Recognition and Separation of Carbon Nanotubes

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Single walled carbon nanotubes (SWCNT) are a family of molecules that have the same cylindrical shape but different chiralities. The SWNT sorting problem, i.e., separation of a synthetic mixture of tubes into individual single-chirality components, has attracted considerable attention in recent years. A systematic and general method to purify each and every single-chirality species of the same electronic type from the synthetic mixture is highly desirable. Recently, we have reported such a method that allows purification of all 12 major single-chirality semiconducting species from a synthetic mixture, with sufficient yield for both fundamental studies and application development (Tu *et al.*, ***Nature***, 406, 250, 2009). In this presentation, I will review the experimental development and mechanistic understanding of the separation process. In particular, a model of DNA wrapping structure invoking a novel secondary DNA structure motif will be discussed.