

# Single-walled carbon nanotube assemblies for solar cells

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The unique nanoscale physical and chemical properties make single-walled carbon nanotubes (SWNTs) stand out as promising building blocks for the next generation energy and electronics. However, the much inferior micro/macroscale properties have been hindering their real-world application. In this study, we discuss two different SWNT assemblies at the micro/macroscale, the random-oriented network and microhoneycomb network, using SWNT-Si solar cells as a benchmark. The random-oriented network possesses both high transparency and conductivity, leading to a 11% efficiency; while the microhoneycomb network organizes charge transfer in an effective way, resulting in a record-high 72% fill factor. Both of the results are stable after months, which is attributed to the high-purity pristine SWNTs. The detailed mechanisms are also discussed.

1. K. Cui et al, J. Phys. Chem. Lett. 2013, 4, pp. 2571-2576
2. K. Cui et al, submitted