

Dispersion, separation, and application of single-wall carbon nanotubes

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For the practical application of single-wall carbon nanotubes (SWCNTs), metal semiconductor separation is one of the most important issues to be solved. Recently, some excellent separation methods, such as density gradient ultracentrifugation, were developed and now we can obtain high-purity semiconducting and metallic SWCNTs very easily. Our research group has also developed a new separation method using agarose gel [1] and tried to use them for field effect transistors. Semiconductor enriched SWCNTs can be used for a good source of the thin film FET without electrical breakdown process. They all showed on/off ratios higher than 10000. However, the mobility of them was still not good probably due to the defects induced in the ultrasonic dispersion process for the isolation. To solve this problem, we have developed a new method to get isolated SWCNTs with low defect density. We have also developed new separation method and FET device fabrication process. In this presentation, we would like to show total progress in dispersion, separation and application of SWCNTs in our lab.

References

1. T. Tanaka et al., Appl. Phys. Express.2 (2009) 125002.