

## Electronic and Geometric Structures of Various Fullerene Peapods

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Single-wall carbon nanotubes (SWNTs) have attracted many researchers due to their promising electronic and mechanical properties. Control of the physical properties of SWNTs has so far been discussed in terms of their own structures. In addition to this approach, the incorporation atoms or molecules into the inner hollow space of SWNTs is another way to control the physical properties. In such an environment, the physical properties of the incorporated materials frequently undergo considerable modification in comparison with their properties exhibited before doping. Here we report the geometric and electronic structures of SWNTs containing various fullerenes (the so-called “peapods” [1-8]) based on the high-resolution transmission electron microscopy (HRTEM), the electron energy-loss spectroscopy (EELS) and the Raman spectroscopy.

### References

- [1] Smith et al., *Nature*, **396**, 323 (1998).
- [2] K. Hirahara et al, *Phys Rev. Lett.*, **85**, 5384 (2000).
- [3] K. Suenaga et al., *Science*, **290**, 2280 (2000).
- [4] K. Hirahara et al., *Phys. Rev. B*, **64**, 115420 (2001).
- [5] T. Okazaki et al., *J. Am. Chem. Soc.*, **123**, 9673 (2001).
- [6] S. Bandow et al., *Chem. Phys. Lett.*, **347**, 23 (2001).
- [7] J. Lee et al., *Nature*, in press.
- [8] T. Okazaki et al., *Physica B*, in press.