## Putting metallofullerenes and linear-chain polyyne molecules into carbon nanotubes

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A brand new hybrid material  $C_{10}H_2@SWNTs$ , single-wall carbon nanotubes (SWNTs) encapsulating  $C_{10}H_2$  polyyne molecules, has been synthesized and confirmed by Raman spectroscopy and X-ray diffraction measurement. The  $C_{10}H_2$  polyyne molecules composed of linearly bonded *sp*-carbon atoms are aligned inside the SWNTs. This hybrid material exhibits a characteristic Raman signal at 2066 cm<sup>-1</sup> attributable to the stretching vibration of the  $C_{10}H_2$  molecules interacting with SWNTs.

Being entrapped inside the SWNTs, the otherwise unstable  $C_{10}H_2$  molecules are shown to be extremely stable well above 300°C under dry-air conditions. The present approach to trapping highly-reactive polyyne molecules  $C_{10}H_2$  into SWNTs has been successful and can be applied for further investigations on the packing structure and the related chemical reactions in detail.



Figure 1. A schematic drawing of "polyyne-peopod",  $C_{10}H_2$  polyyne molecules aligned inside a (10,10) metallic single-wall carbon nanotube.