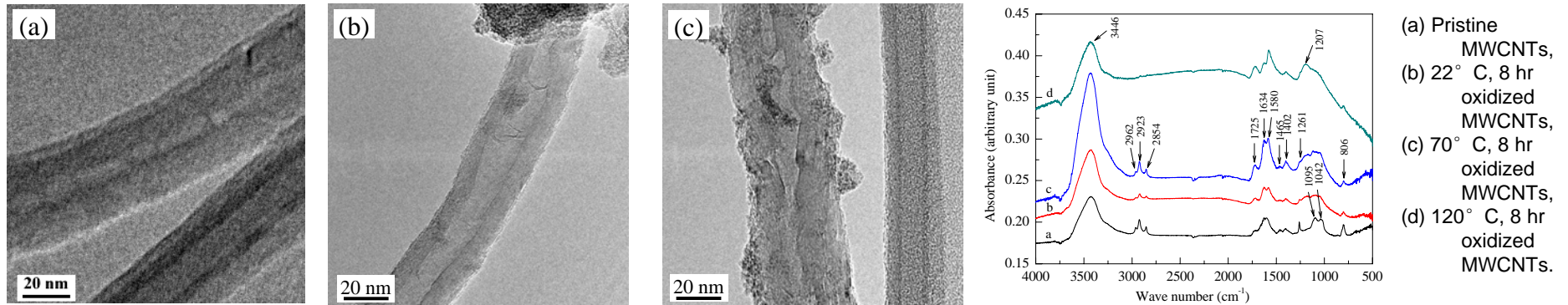
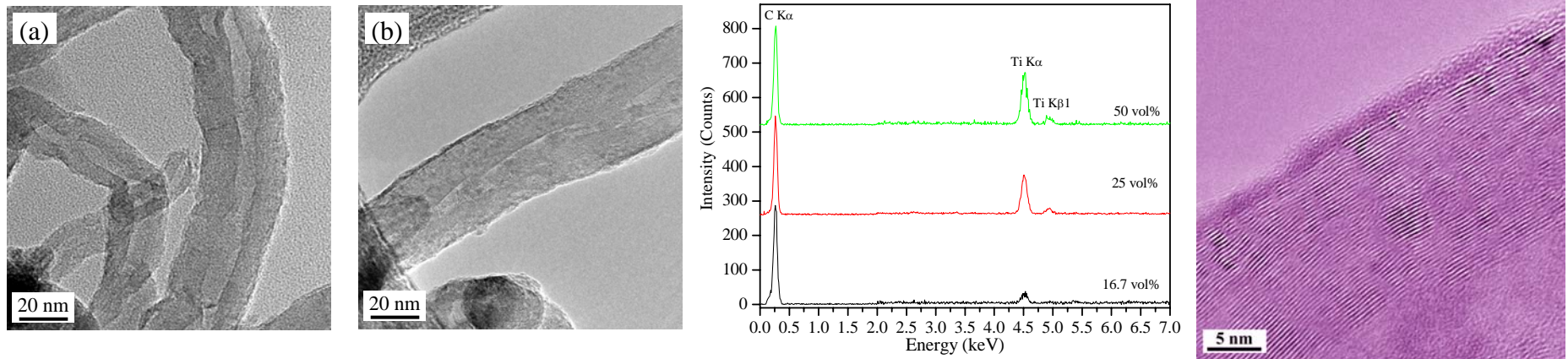


# TiO<sub>2</sub> Nanoparticle Self-assembly onto Functionalized Carbon Nanotubes

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TEM images of: (a) as-is MWCNTs, (b) as-is MWCNTs with TiO<sub>2</sub> sol attachment, and (c) 120°C, 8 hr oxidized MWCNTs with TiO<sub>2</sub> sol attachment showing increasing TiO<sub>2</sub> attachment. FT-IR spectra of MWCNTs and TiO<sub>2</sub> sol decorated MWCNTs.



TEM images and EDS spectra of TiO<sub>2</sub> sol-decorated, oxidized MWCNTs from (a) 16.7 vol% TiO<sub>2</sub> sol solution, (b) 50 vol% TiO<sub>2</sub> sol solution showing increasing TiO<sub>2</sub> attachment.

High magnification image of TiO<sub>2</sub> sol-decorated MWCNTs.

- Conclusions:
1. MWCNTs have been oxidized to produce acid functional groups on the surfaces.
  2. TiO<sub>2</sub> sol has been successfully assembled onto MWCNT surfaces by a sol-gel method.
  3. Surface modification of MWCNTs greatly improves the reactivity of MWCNTs with TiO<sub>2</sub> sol. The thickness of the TiO<sub>2</sub> sol layers increases with TiO<sub>2</sub> sol concentration.
  4. The assembly mechanism is esterification between the -COOH groups of the oxidized MWCNT surfaces and the -OH groups of TiO<sub>2</sub> sol.