**Investigation of electron momentum density in carbon nanotubes using transmission electron microscopy**

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It is best to use the highest incident beam energy in the electron energy-loss spectroscopy experiment, unless doing so causes radiation damage (Brydson, 2001; Egerton, 2014; Williams & Carter, 2009). Figure S1 shows the best ECOSS signal of graphite at the incident energy (a) 60 kV, (b) 120 kV and (c) 200 kV. Except that the exposure time was 3 mins, 2 mins and 1 mins, respectively; the main experimental parameters such as analysis area, camera length, and spectrometer entrance aperture were the same as those of CNTs in the paper. To get low noise, stable and smooth signal of ECOSS, we chose the 200 kV incident beam energy in the work.





Figure S1 The best ECOSS signal of graphite at the incident energy (a)60 kV, (b)120 kV and (c) 200 kV. The exposure time was 3 mins, 2 mins and 1 mins, respectively.

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