

Supporting Information

Crystal plane dependent growth of aligned single-walled carbon nanotubes on sapphire

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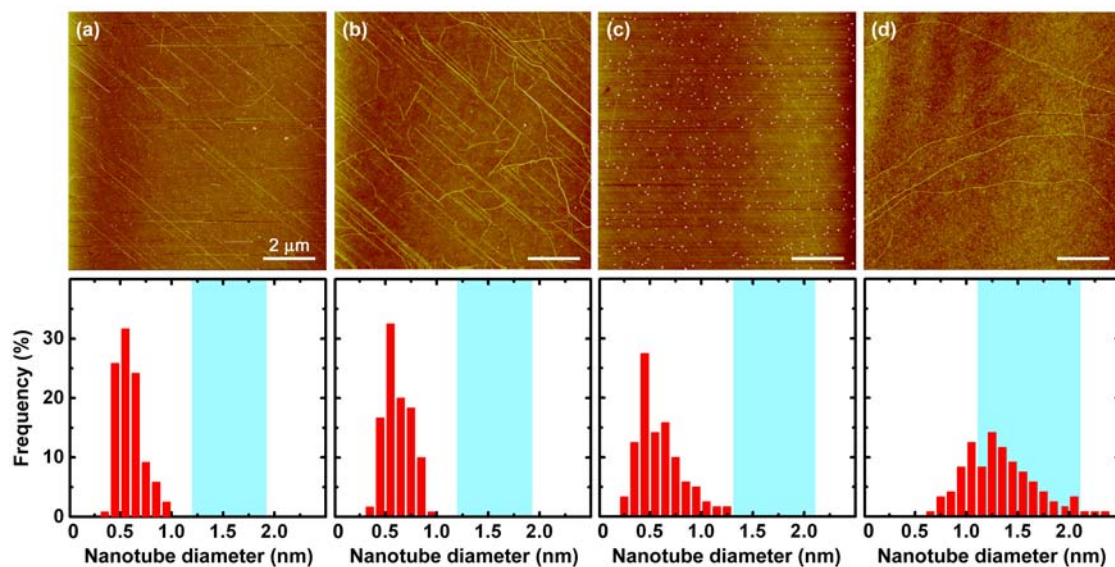


Figure S-1. AFM images and height distributions of SWNTs grown at 900 °C on sapphire A-plane (a), R-plane (b), C-plane (c), and SiO₂/Si (d) substrates. The total number of counted nanotubes is 120. The hatched area shows the diameter distribution obtained from the RBM signals of the Raman spectra (Fig. 4). Comparison of the AFM, Raman, and PL (Fig. 8) data suggests that AFM does underestimate the nanotube diameter, presumably because of the process-induced substrate inhomogeneities. In particular, the carbon deposition could bury the SWNTs thus effectively reducing the AFM diameters for the sapphire substrates. However, the qualitative trends regarding the width and position of the diameter distribution could be assessed.

A-plane

(15, 1)

SWNT growth
direction

[0 0 0 1]

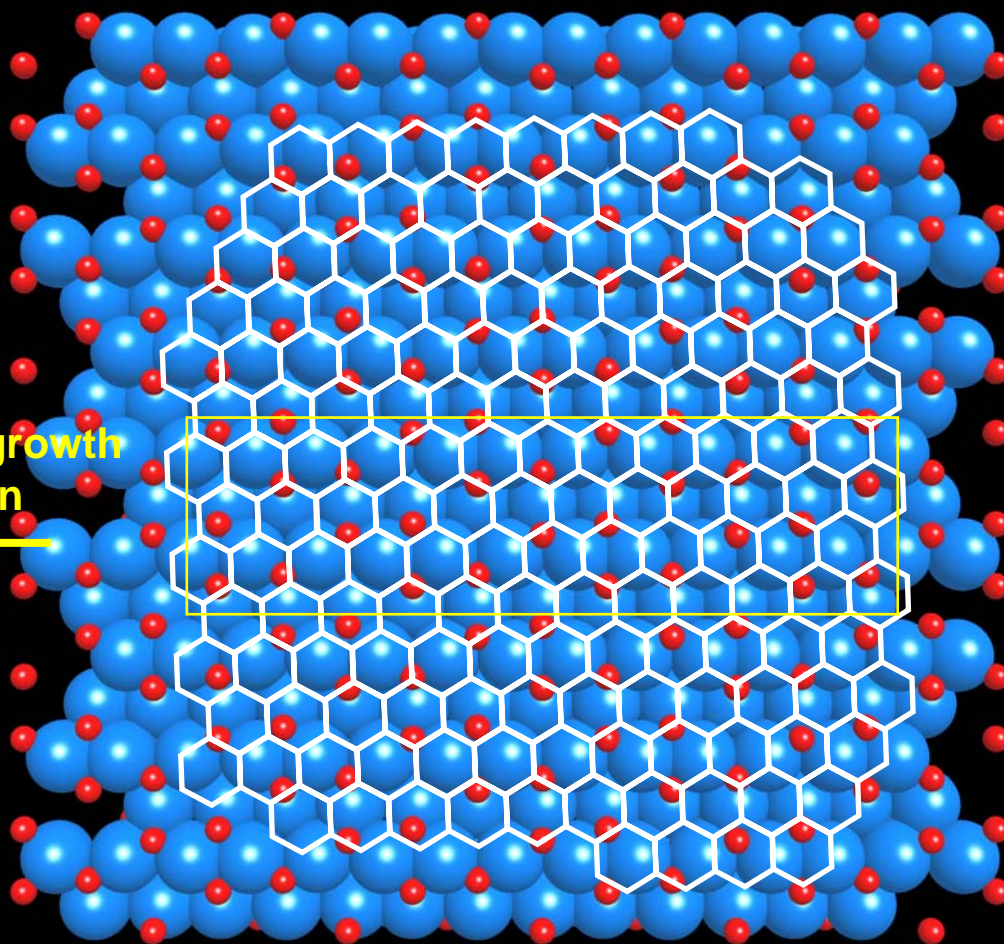
[1 $\bar{1}$ 0 0]

Figure S-2 (a). Atomic model of A-plane sapphire (red: Al, blue: O) and graphene network expanded from (15, 1) SWNT (white).

A-plane

(9, 8)

SWNT growth
direction



$[0001]$

$[1\bar{1}00]$

Figure S-2 (b). Atomic model of A-plane sapphire (red: Al, blue: O) and graphene network expanded from (9, 8) SWNT (white).

R-plane

(15, 1)

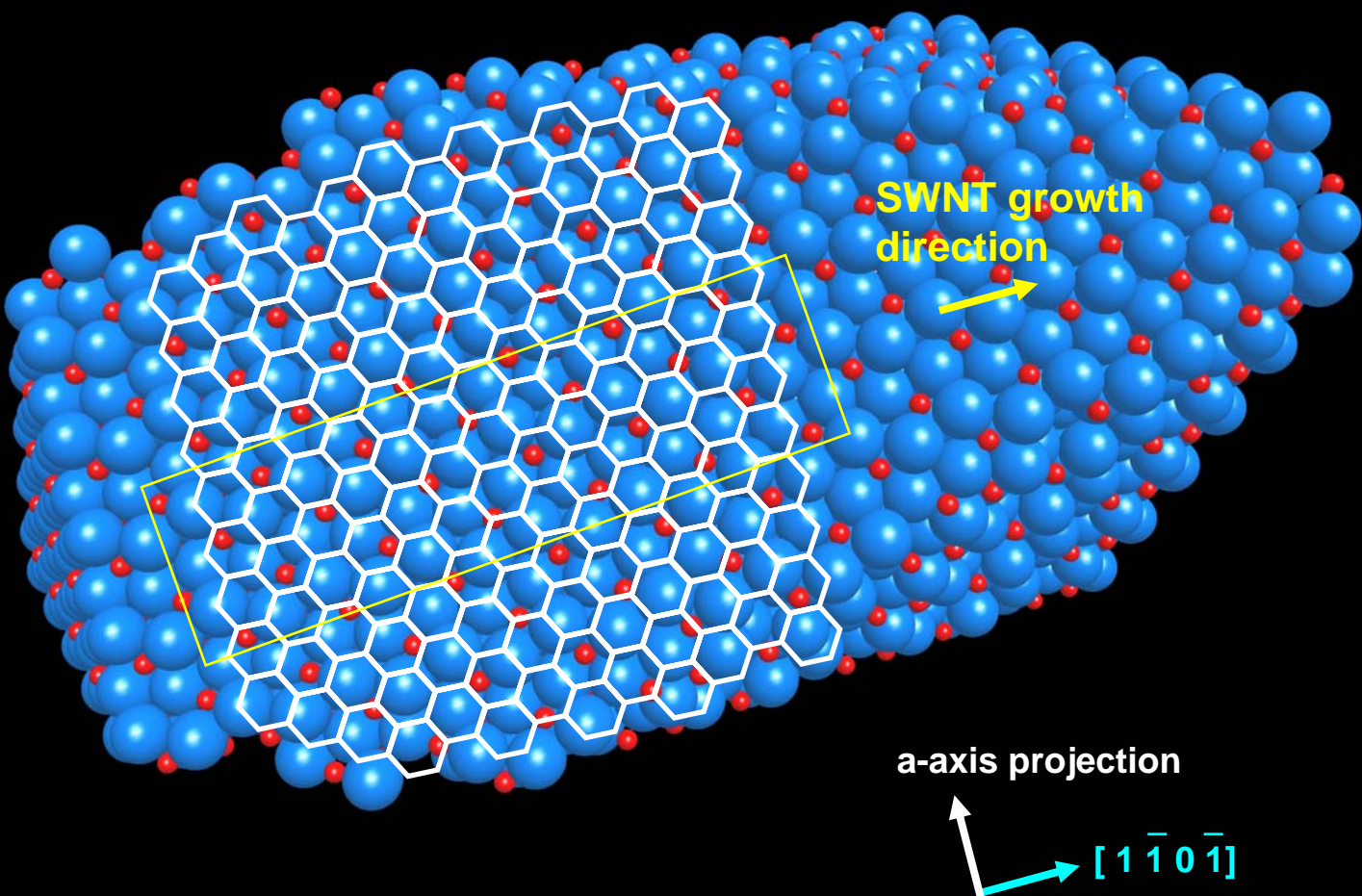


Figure S-2 (c). Atomic model of R-plane sapphire (red: Al, blue: O) and graphene network expanded from (15, 1) SWNT (white).

R-plane

(9, 8)

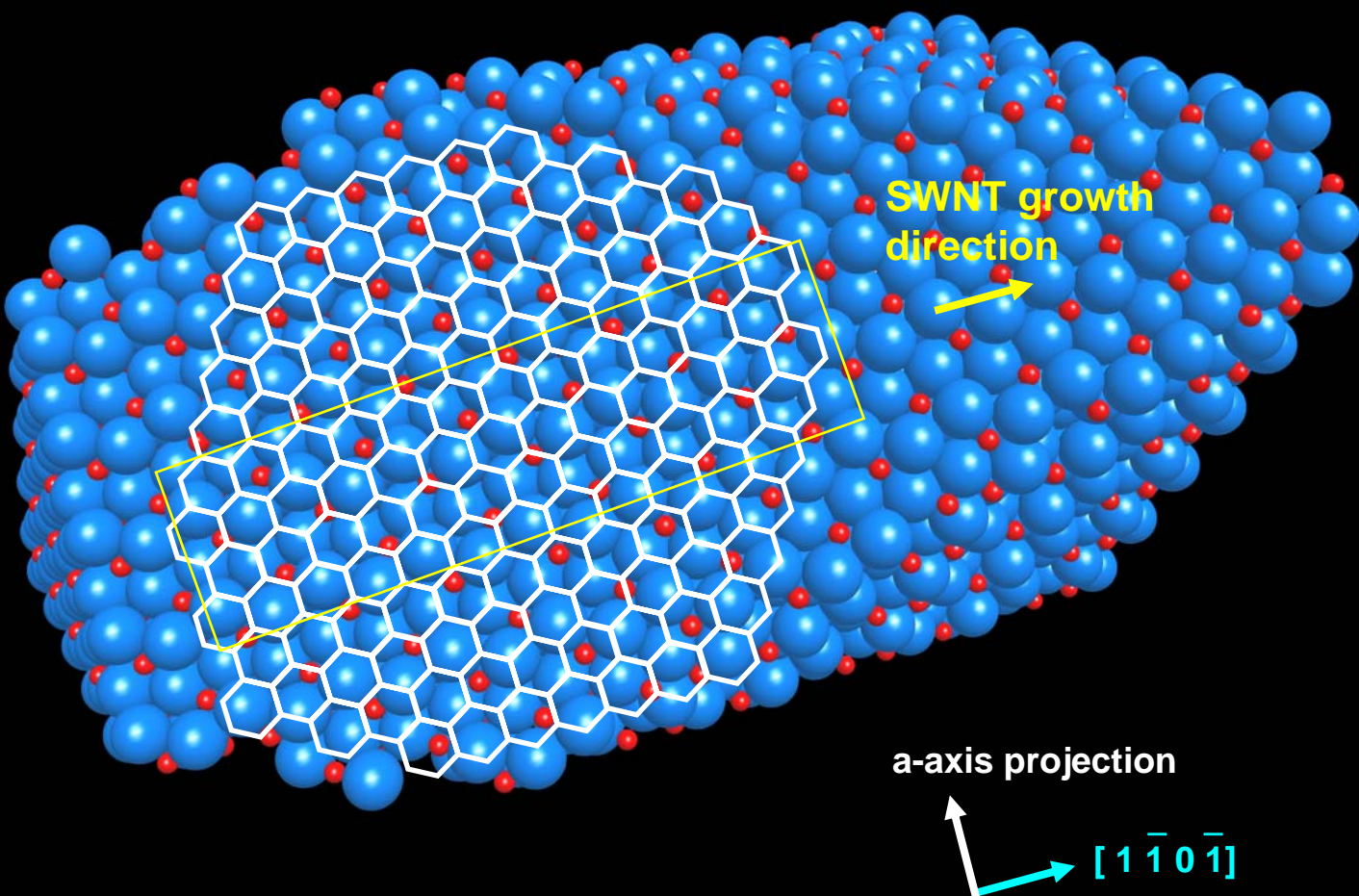


Figure S-2 (d). Atomic model of R-plane sapphire (red: Al, blue: O) and graphene network expanded from (9, 8) SWNT (white).