# Supporting Information

## de Heer et al. 10.1073/pnas.1105113108

### SI Structured Graphene Growth

The process has been applied to more complex structures as shown in Fig. S1 *A–C*, where a two vertical 400 nm deep trenches are crossed with a 15 nm deep, 1 μm wide depression. The structure is annealed and graphitized using the confinement controlled sublimation (CCS) method. Annealing causes the observed rounding of the previously straight sidewalls and graphitization produces a 40 nm graphene sidewall ribbon as revealed by electrostatic force microscopy. The increased width compared with the sidewall width is caused by recrystallization of the vertical sidewalls (initially exposing a 1–100 face) to (1–10*n*) with a reduced slope (23° from horizontal for $n = 10$) to produce wider ribbons.

The narrow ribbons are seamlessly connected to wide ribbons that were formed on the sidewalls of the deep trench as revealed in the electrostatic force micrograph (Fig. S1*C*). Transport measurements demonstrate the continuity of the sidewall ribbons. The resistivity of sidewall ribbons is about 100 Ω per square, which is comparable to measurements on doped two-dimensional epitaxial graphene sheets (*n* doping on the order of $10^{12}/cm^2$ is typically observed). These resitivities are orders of magnitude smaller than observed in lithographically patterned ribbons of comparable width, indicating that the sidewall graphitization method produces ribbons with smoother edges. Moreover, there is no evidence for Coulomb blockade effects that result from edge roughness in exfoliated graphene ribbons (1). In fact, recent measurements of gated sidewall ribbons between 20 and 40 nm wide and from 1 to 2 μm long indicate that they are ballistic, resembling carbon nanotubes in that respect. In fact, there is no indication of a bandgap in these ribbons (these results will be published elsewhere). These examples show that sidewall graphitization is an effective and simple method to produce interconnected nanoscopic graphene ribbons and other graphene nanostructures, without resorting to nanolithographic methods.

1. Ozyilmaz B, Jarillo-Herrero P, Efetov D, Kim P (2007) Electronic transport in locally gated graphene nanoconstrictions. *Appl Phys Lett* 91:192107.

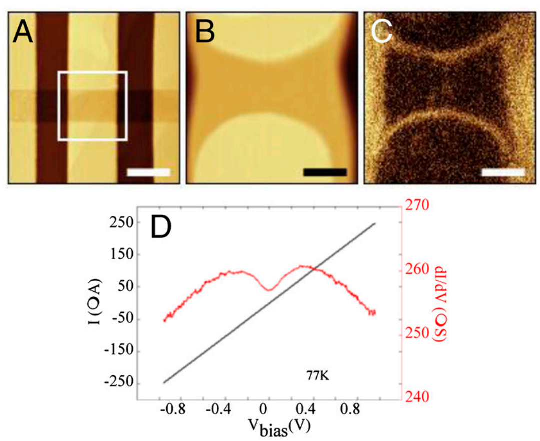


**Fig. S1.** Templated CCS sidewall graphene ribbons. (*A*) AFM image of two 1 μm deep trenches (brown) etched in SiC Si-face (scale bars are 1 μm). The trenches are connected by a 10 nm deep trench (light brown). (*B*) After annealing, the initially straight trench walls becomes rounded, indicating significant SiC mass flow. (*C*) EFM shows that 20 nm graphene graphene ribbons have grown on the trench sidewalls (verified in Raman spectroscopy). The wide graphene ribbons concurrently grown on deep μm high sidewalls serve as current leads and voltage probes. (*D*) I–V characteristics of the two 20 nm wide, 1.5 μm long ribbons in parallel. The resistance corresponds to 8 kΩ per ribbon (corresponding to about 100 Ω/square) and exhibits a weak zero bias anomaly.