

Supplementary Information

Electronic characterization of silicon intercalated chevron graphene nanoribbons on Au(111)

O. Deniz,^a C. Sánchez-Sánchez,^{a,†} R. Jaafar,^a N. Kharche,^b L. Liang,^c V. Meunier,^b X. Feng,^d K. Müllen,^e R. Fasel,^{a,f} P. Ruffieux^a

dI/dV spectra of Au(111)-supported chevron GNRs

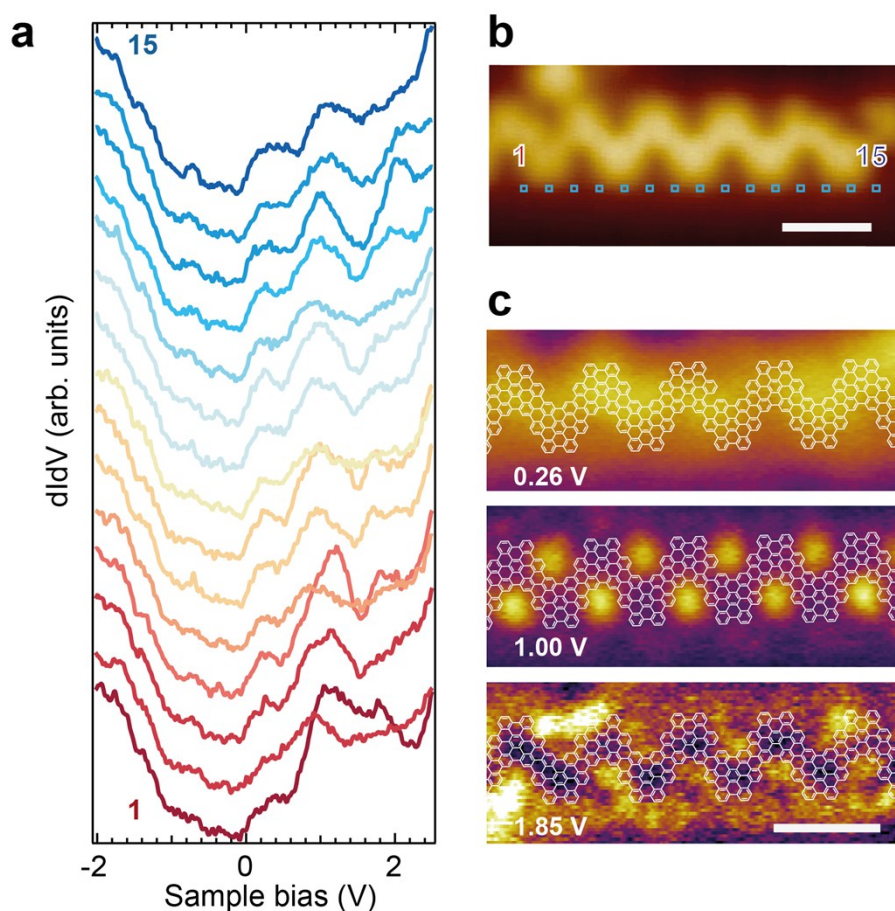


Figure S1: Further details on the relative contribution of substrate- and chevron GNR-related electronic states are gained from dI/dV spectra taken at different positions of the chevron GNR. (a) Series of dI/dV spectra recorded along the edge of a chevron GNR. Depending on the relative position within the GNR unit cell, different surface state contributions dominate the unoccupied part of the spectrum. For all positions, the surface state contribution in the range from the Fermi level (E_F) to $E_F + 1.5$ eV shows a higher intensity than the chevron GNR conduction band onset at $E_F + 1.6$ eV ($U_{sample} = -2$ V, $I = 0.08$ nA, 77 K). (b) STM topography image with marked positions where spectra shown in (a) have been taken ($U_{sample} = 0.26$ V, $I = 0.08$ nA, 77 K). Scale bar: 2 nm. (c) dI/dV maps recorded at indicated sample bias. Scale bar: 2 nm.

Effect of Si adsorption at chevron GNR edges

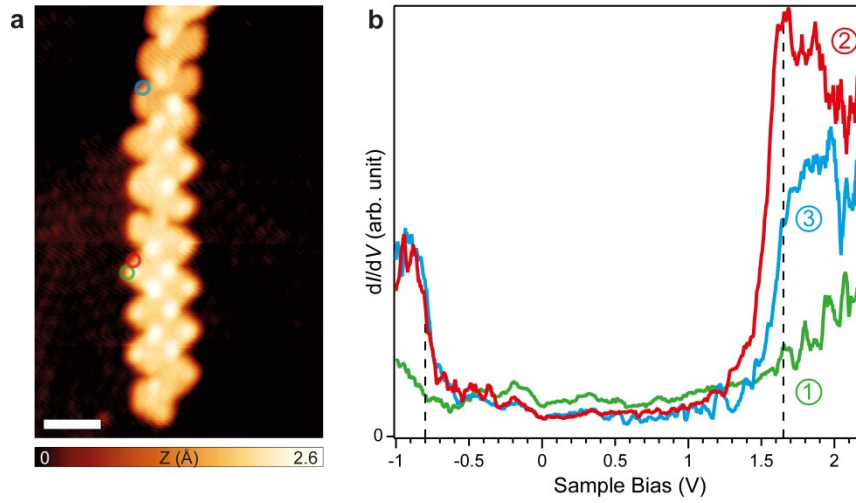


Figure S2: dI/dV spectra ($U_{sample} = -1$ V, $I = 0.6$ nA, 5 K) recorded on Si intercalated chevron GNR: a) Topography image ($U_{sample} = -1$ V, $I = 0.6$ nA, 5 K) of the chevron GNR segment on which the spectra were taken, b) Spectra recorded at the corresponding positions marked with circles in (a). In order to verify the absence of any Si related spectral feature, we have taken three spectra with the same tip condition; (1) on top of the Si adsorbed chevron GNR edge, (2) the adjacent intact edge next to adsorbed Si and (3) an equivalent intact edge away from the Si adsorbed edge. Spectra (2) and (3) exhibit the same GNR states while spectrum (1) shows an essentially featureless curve. We can thus state that adsorbed Si only locally impacts dI/dV spectra, and in particular, it does not introduce any specific spectral features. A few Å away from the Si, the characteristic GNR states are fully recovered.

Wavefunction distribution of occupied and unoccupied states of chevron GNRs

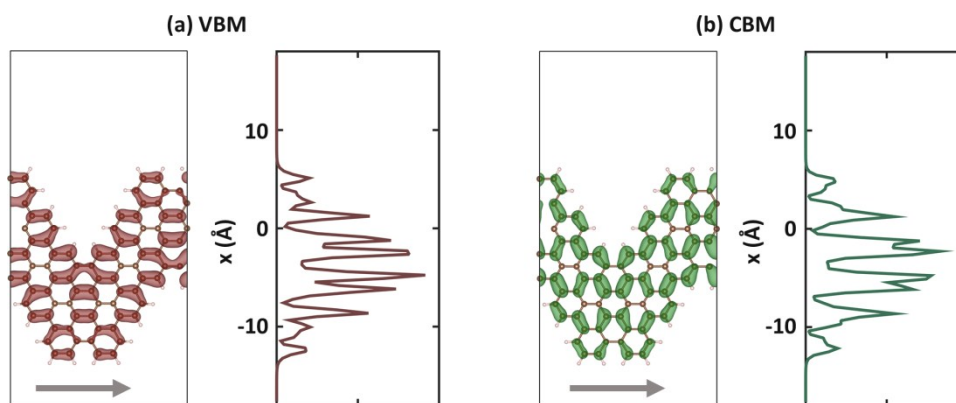


Figure S3. Wavefunctions at the (a) valence band maximum (b) conduction band minimum of the chevron GNR. Right panels in (a) and (b) show wavefunctions averaged out along the periodic direction of the nanoribbon (depicted by the gray arrows) and in the direction normal to the GNR plane. These planar averaged wavefunctions were used in the image-charge model calculations.