

## Supplementary Information.

### Chemical gating of epitaxial graphene through ultrathin oxide layers

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## I. NEXAFS SPECTROSCOPY

The C K-edge NEXAFS spectra were measured in the Auger yield mode by revealing the photoelectrons at a kinetic energy of 260 eV corresponding to the C-KLL transition. Angular dependent spectra were taken as a function of the angle  $\theta$  between the electric field  $E$  of the photon beam (which was horizontally polarized) and the normal to the substrate plane (or between the x-ray beam and the substrate plane). The angle  $\theta$  was varied between  $20^\circ$  (grazing incidence) and  $90^\circ$  (normal incidence) by rotating the samples. The strong dichroism between the spectra measured in the two geometries observed for all interfaces indicate that graphene remains flat on the substrate plane.

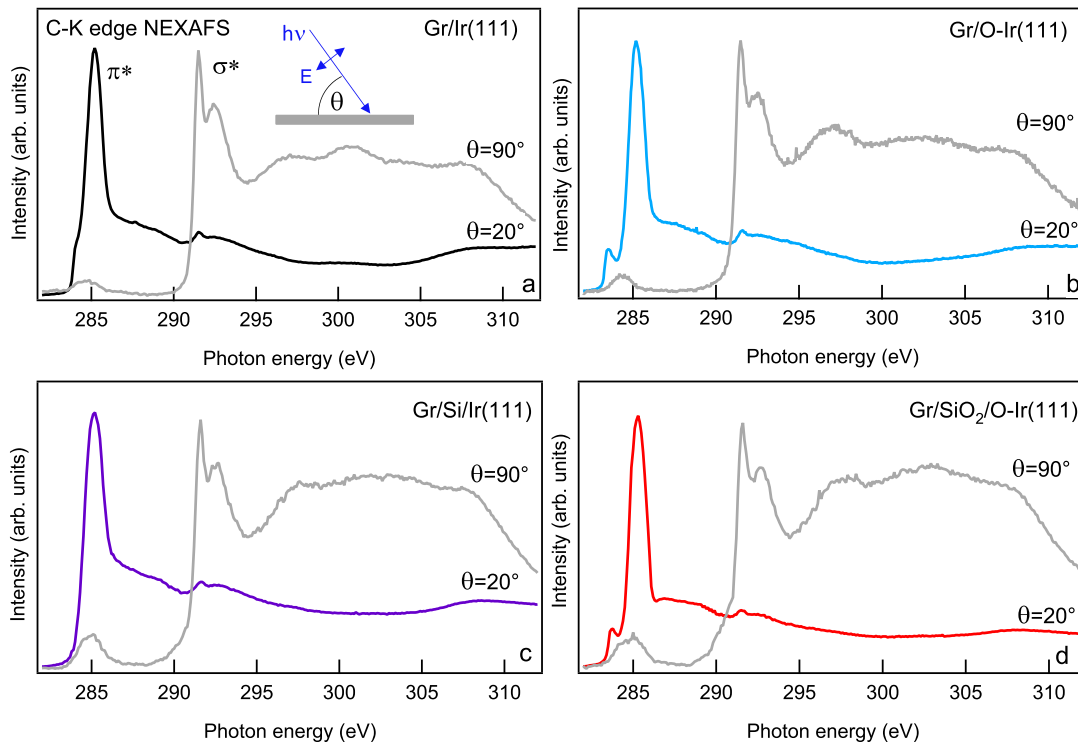


FIG. 1. Angular dependence of the NEXAFS spectra measured (a) on the Gr/Ir(111) surface, after the intercalation of (b) oxygen (0.5 ML) or (c) silicon (2.6 ML), and (d) after the synthesis or  $\text{SiO}_2$  (3.5 ML) by stepwise intercalation of Si and O. The NEXAFS spectra were aligned at the position of the  $\sigma^*$  resonance at 291.5 eV.