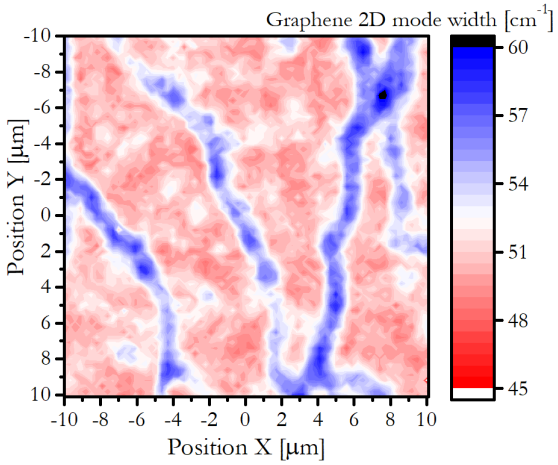
CERTIFICATION

DATASHEET

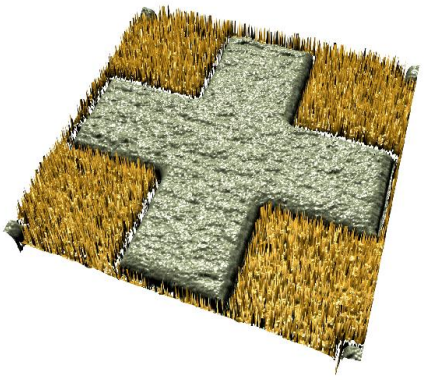
MICRO-RAMAN SPECTROSCOPY

High-resolution 2D Raman imaging	0.3-µm-step mapping of the graphene modes at a 532-nm laser line and comprehensive data analysis
Phase-resolved 3D Raman imaging	Three-dimensional material-sensitive reconstructions with 0.3-µm lateral resolution and sub-diffractive vertical resolution at a 532-nm laser line
Traditional Raman analysis	Statistical assessment of the graphene G and 2D band positions, 2D mode width, and the 2D-to-G band intensity ratio
Functional Raman analysis	Fractional assessment of the number of the graphene layers based on the shadow that graphene casts on substrate-related Raman-active modes

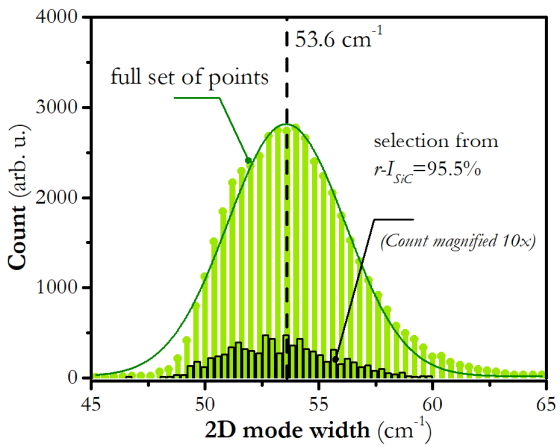
High-resolution 2D Raman imaging



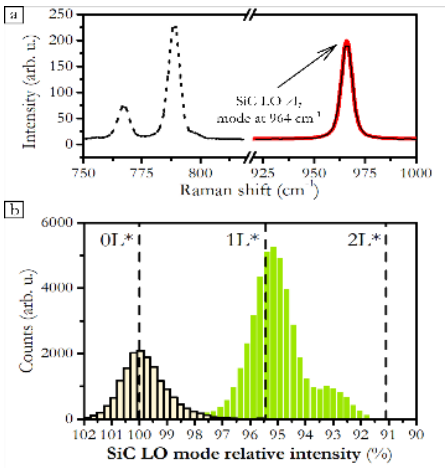
Phase-resolved 3D Raman imaging



Traditional Raman analysis



Functional Raman analysis



References:
1) Spectroscopic properties of close-to-perfect-monolayer quasi-free-standing epitaxial graphene on 6H-SiC(0001); 10.1016/j.apsusc.2023.158617
2) Phase-resolved 3D imaging of graphene based heterostructures; 10.13140/RG.2.2.35523.58401/1

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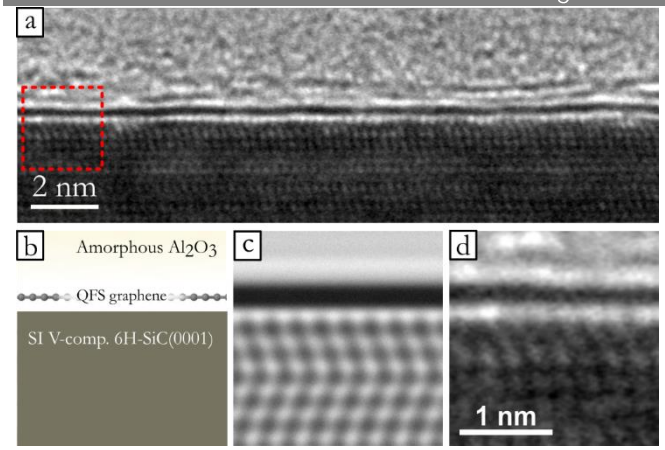
Transmission Electron Microscopy

High-resolution TEM



(a) High-Resolution Transmission Electron Microscope cross-sectional image of aluminum-oxide-passivated hydrogen-intercalated quasi-free-standing epitaxial Chemical Vapor Deposition graphene on semi-insulating vanadium-compensated on-axis 6H-SiC.

(b) Schematic of the material structure.

(c) Simulation of the TEM image.

(d) Actual close-up of the 2-nm × 2-nm area marked with a red dashed line in sub-figure (a)

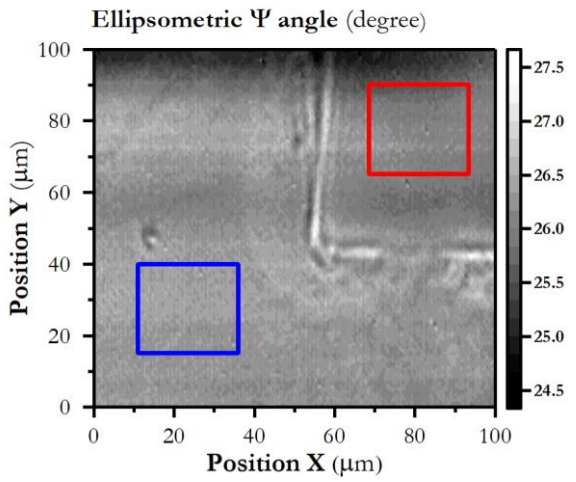
References:
1) Spectroscopic properties of close-to-perfect-monolayer quasi-free-standing epitaxial graphene on 6H-SiC(0001); 10.1016/j.apsusc.2023.158617

Spectroscopic Ellipsometry

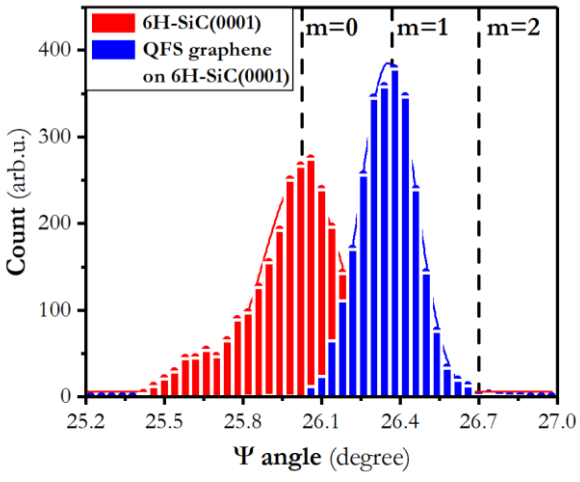
High-resolution 2D Raman imaging — Mapping of the ellipsometric angles Ψ and Δ at the wavelength of 490 nm

Phase-resolved 3D Raman imaging — Fractional assessment of the number of the graphene layers based on the distribution of the ellipsometric angle Ψ at the wavelength of 490 nm

2D ellipsometric imaging



Functional ellipsometric analysis



References:
1) Spectroscopic properties of close-to-perfect-monolayer quasi-free-standing epitaxial graphene on 6H-SiC(0001); 10.1016/j.apsusc.2023.158617

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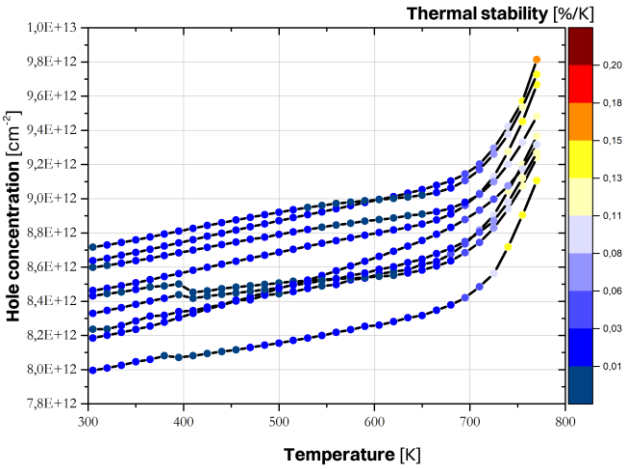
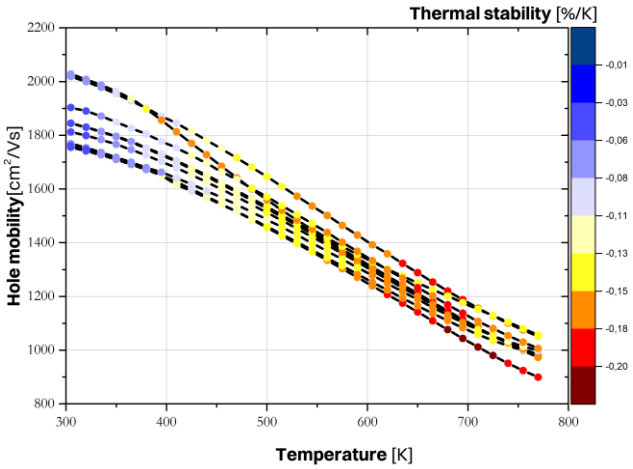
OTHER METHODS

2D Kelvin probe analysis	Assessment of the uniformity of the electrical properties based on the distribution of the surface potential relative to a silicon probe
Transport assessment	Direct-current Hall-effect-derived charge carrier concentration and mobility in static magnetic field of 0.55 T: 300 K to 770 K

Charge carrier concentration	Charge carrier mobility





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