

ELECTRONIC SUPPLEMENTARY INFORMATION

Direct Epitaxial CVD Synthesis of Tungsten Disulfide on Epitaxial and CVD Graphene

Giuseppe V. Bianco,^{1} Maria Losurdo,¹ Maria M. Giangregorio,¹ Alberto Sacchetti,¹
Paola Prete,² Nico Lovergine,³ Pio Capezzuto,¹ and Giovanni Bruno¹*

¹Institute of Nanotechnology, CNR-NANOTEC, Department of Chemistry, University of Bari, via Orabona 4, 70126 Bari, Italy.

²Institute for Microelectronic and Microsystems, National Research Council, UOS Lecce, Via Monteroni, I-73100 Lecce, Italy

³Department of Innovation Engineering, University of Salento, Via Monteroni, I-73100 Lecce, Italy

*email: giuseppevalerio.bianco@cnr.it

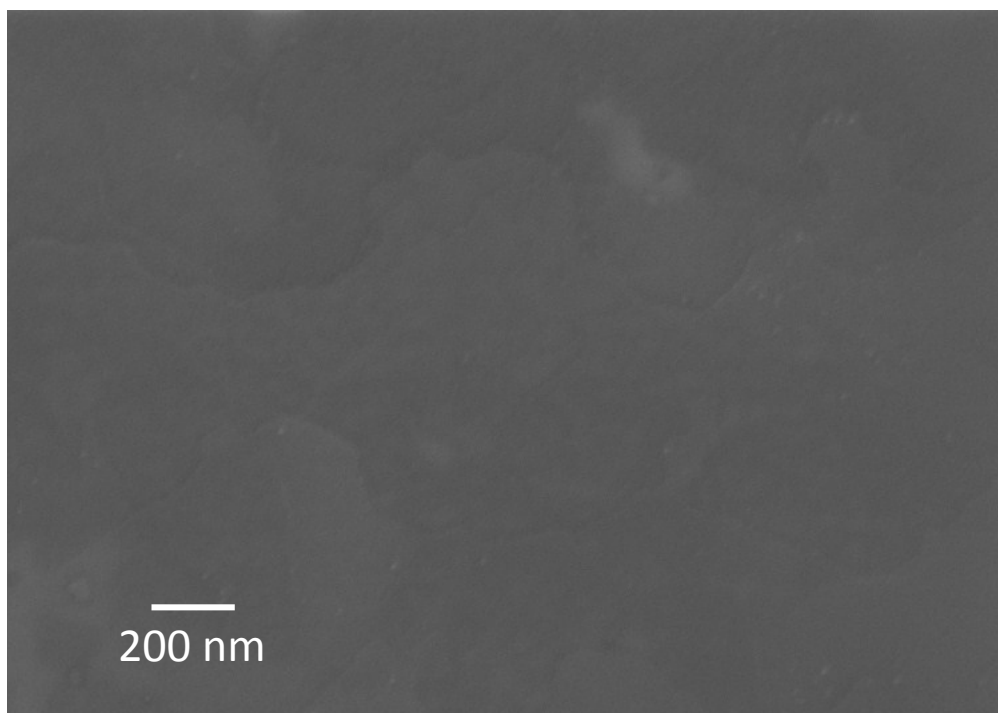


Fig. S1. SEM image of epi-graphene on SiC substrate.

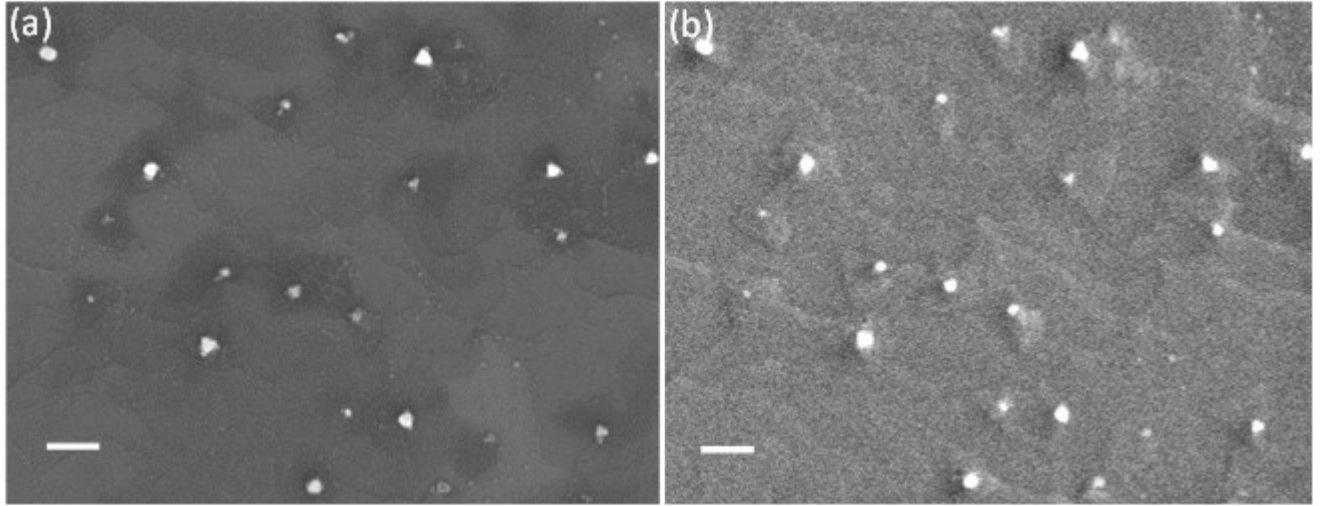


Fig. S2. SEM images of WS₂ on epitaxial graphene (as grown on SiC) acquired by an in-lens (a) and a secondary electron detector (b). The in-lens detector image, based on differences in the work functions between WS₂ and the substrate, provides a better color contrast. Conversely, the secondary electron detector image provides an improved topographic information by maximizing the contrast at the edges of WS₂ crystals and of the SiC steps. Fig. S2b clearly shows the first layers of WS₂ nanostructures (the layer in direct contact with the graphene/SiC substrate) which appear as equilateral triangles with lateral size in the order of 200 nm. The monolayer nature of such features can be attested by taking as reference the step height of the SiC terraces (0.75 nm, one half of the lattice constant of the 6H-SiC crystal in the (0001) direction) that is fully comparable with the thickness value expected for a single WS₂ layer (≈ 0.7 nm).

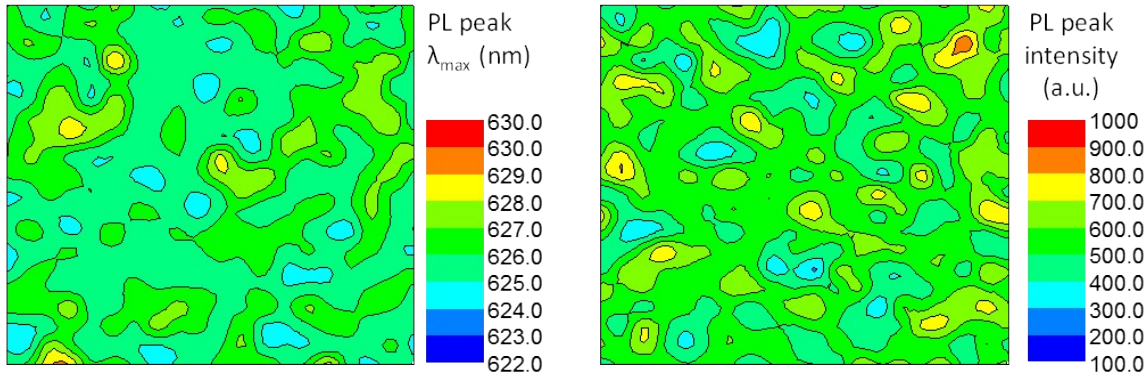


Fig. S3. 20 x 20 μm maps of the spectral position (a) and absolute maximum intensity (b) of the PL peak for the WS₂ sample grown on e-G/SiC with a deposition time of 10 min.