Raman spectroscopy fitting results

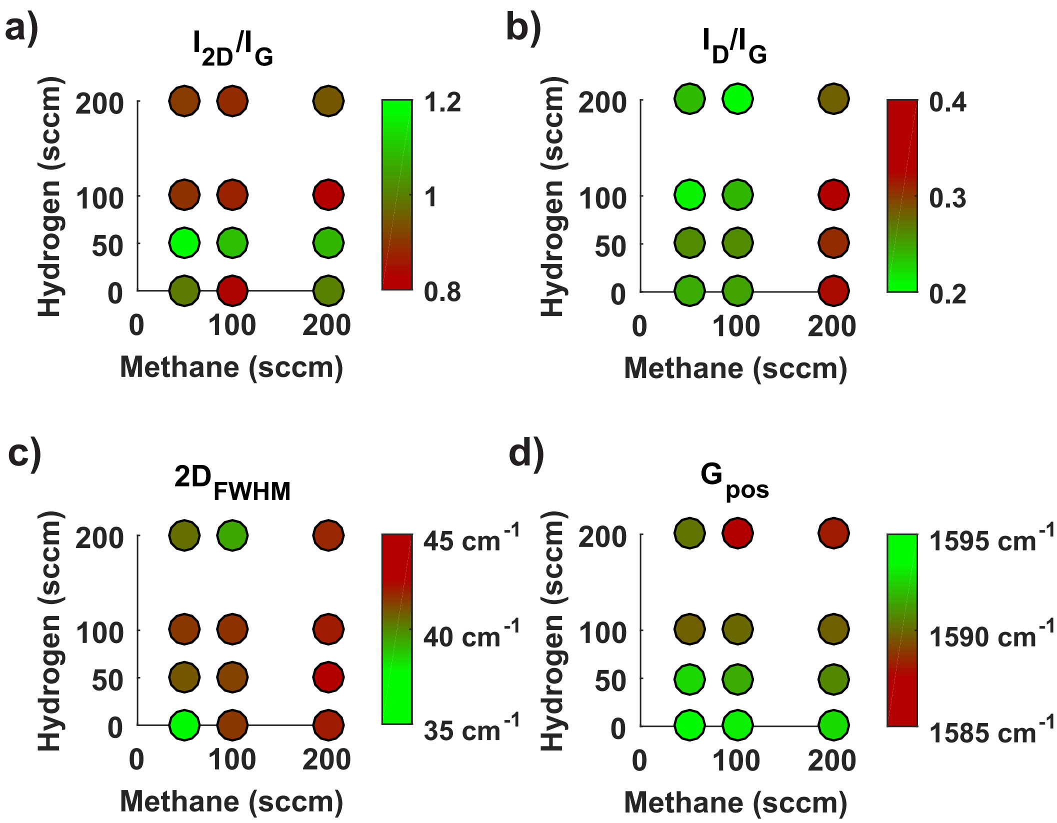

Figure S1: Graphene quality results as function of the hydrogen and methane gas flow settings, aiming for defect free, single layer graphene. 2D-to-G peak intensity ratio I_{2D}/I_G (a); this ratio gives a rough indication for the number of graphene layers. D-to-G peak intensity ratio I_D/I_G (b); the lower this ratio, the less defects present in the graphene. Full width half maximum (FWHM) of the 2D peak (c); single layer graphene possesses a sharp 2D peak. G peak position (d); a higher G peak position is related to fewer graphene layers. Green indicates better quality graphene and red lesser quality graphene.

Atomic force microscopy data

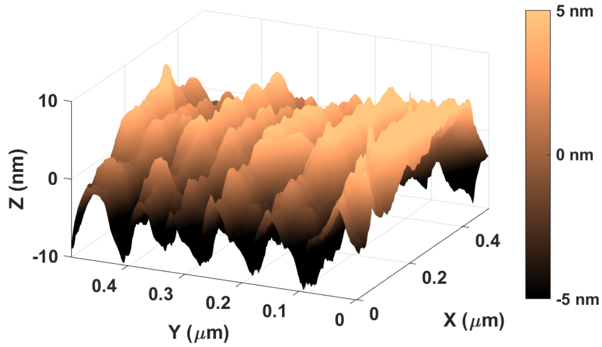

Figure S2: AFM recording of the mesa area directly after the CVD process. The ridges are caused by the dewetting of the copper.

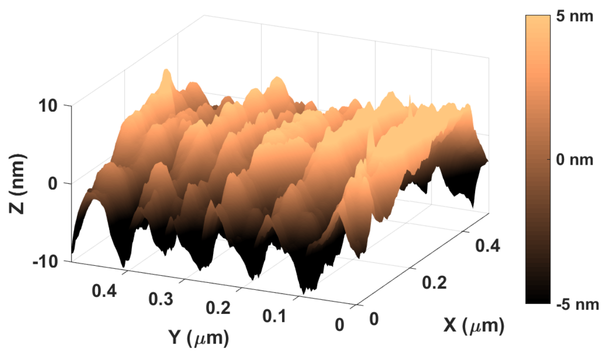

Figure S3: AFM recording of the mesa area after 13 min of 500 W O_2-plasma to strip the deposited graphene. The ridges are still present and the amplitude did not change significantly, thus the silicon dioxide surface has been ridged.

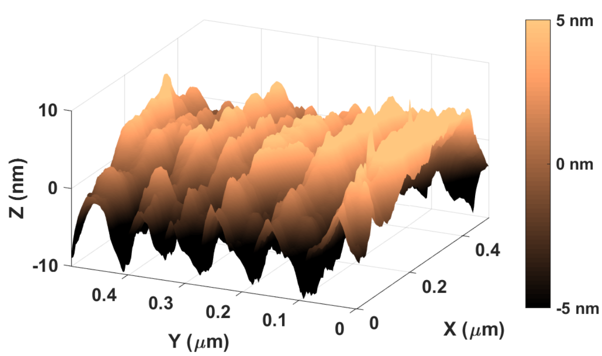

Figure S4: AFM recording of the mesa area after 120 sec of etching in 1% HF solution, which etches silicon dioxide for ~ 10 nm. The amplitude did not change significantly, thus the graphene layer is continuous.

Energy selective backscatter data

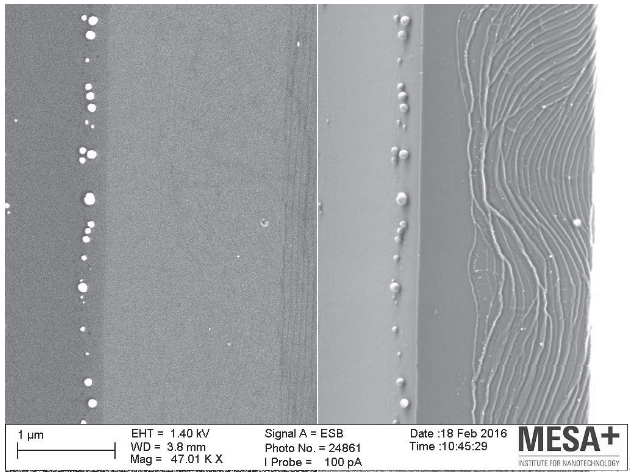

Figure S5: Energy selective backscattered (EsB) detector (left), High efficiency secondary electron (HE-SE2) detector (right). On the right image some copper particles are clearly visible next to the mesa. In right image this gives a clear contrast, since this detector is sensitive for difference in elements.

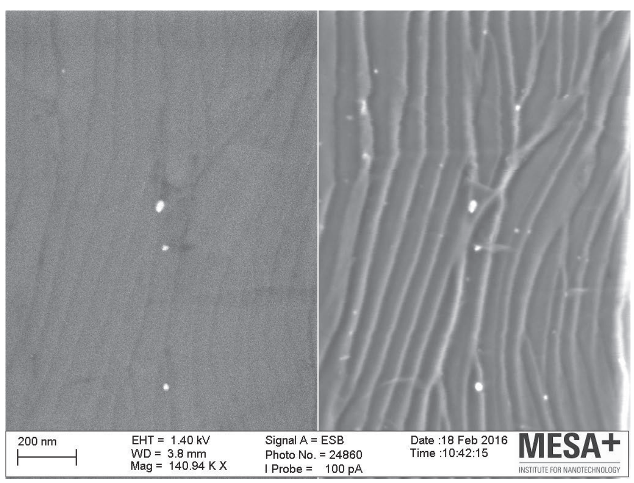

Figure S6: Energy selective backscattered (EsB) detector (left), High efficiency secondary electron (HE-SE2) detector (right). When zooming in to the mesa area, the grooves are visible with some white particles in the right image. The particles give strong signal in the left image, thus they must also be copper. EDX analysis conforms that silicon, oxide, copper and carbon are the only elements present on the sample.

CVD log data

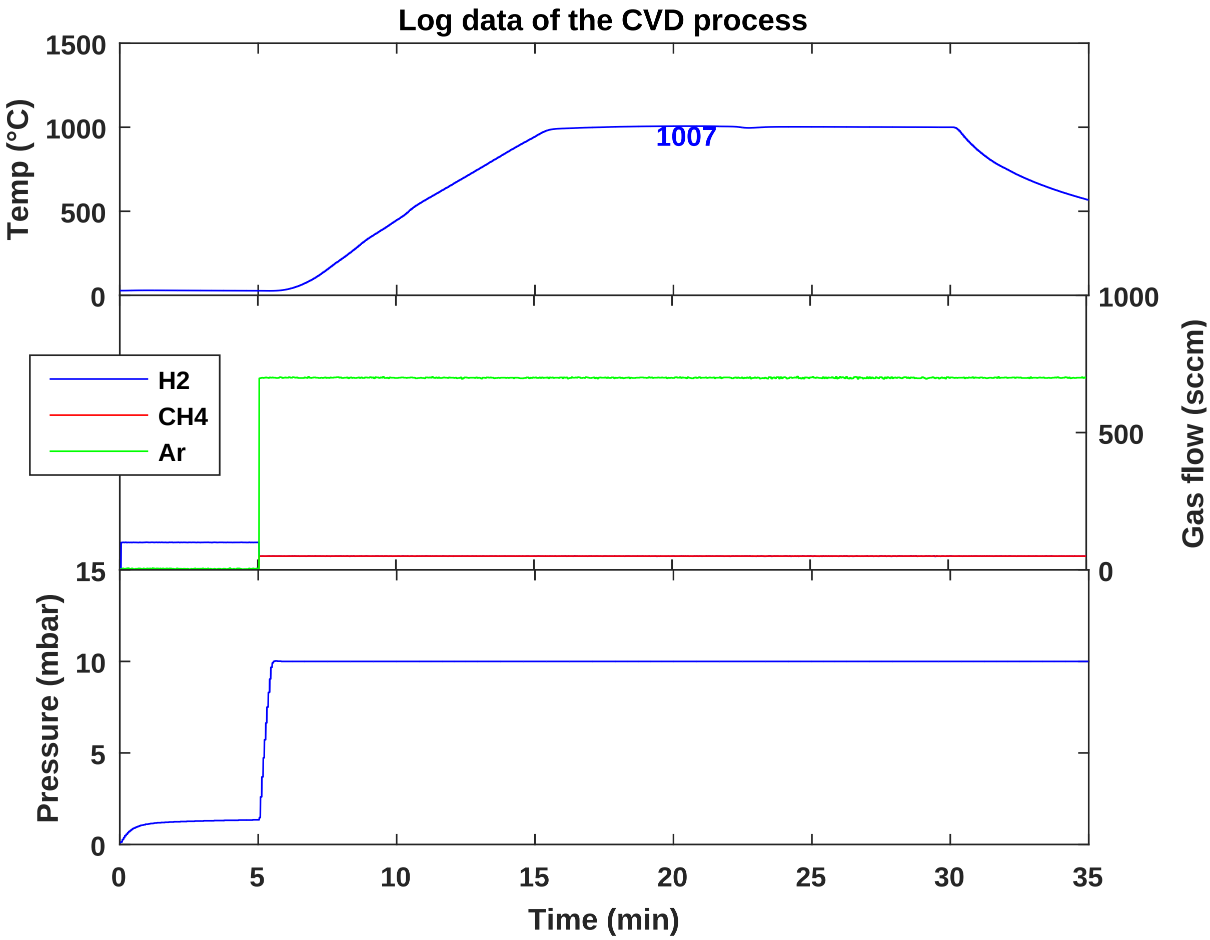

Figure S7: The log data of a typical CVD treatment showing the temperature profile, hydrogen, methane and argon gas flows and the pressure over time.

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