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Electronic Supplementary Information

Synergistic enhancement of hydrogen interactions in palladium-gold-silicon metallic glass on multilayered graphene†

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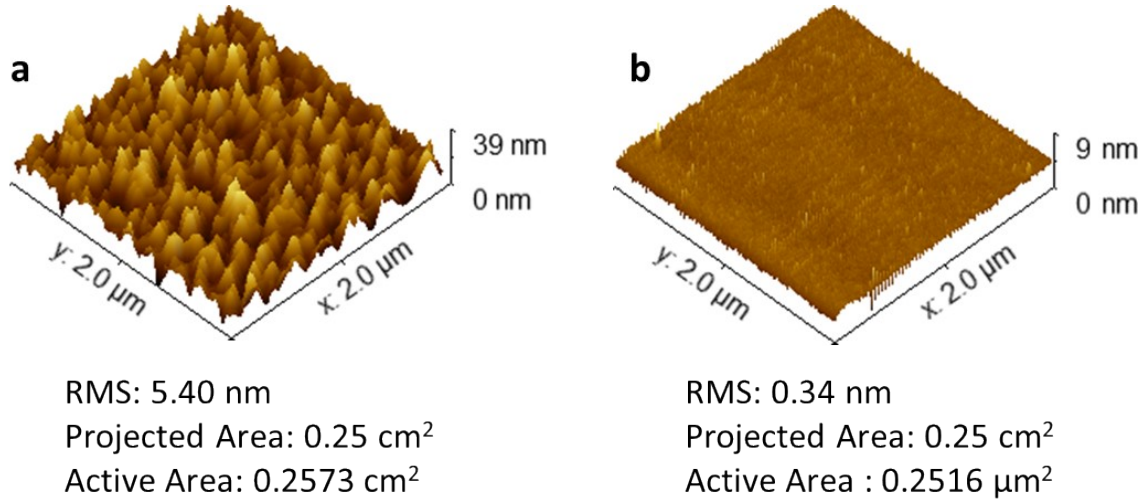

RMS: 5.40 nm
Projected Area: 0.25 cm^2
Active Area: 0.2573 cm^2

RMS: 0.34 nm
Projected Area: 0.25 cm^2
Active Area : 0.2516 μm^2

Fig. S1. Tribological analysis of the (a) PdSiAu+Si/SiO_2 and (b) MLGR+PdSiAu+Si/SiO_2 using atomic force microscopy. The room mean square (RMS) roughness, projected and active areas are provided below the corresponding images.

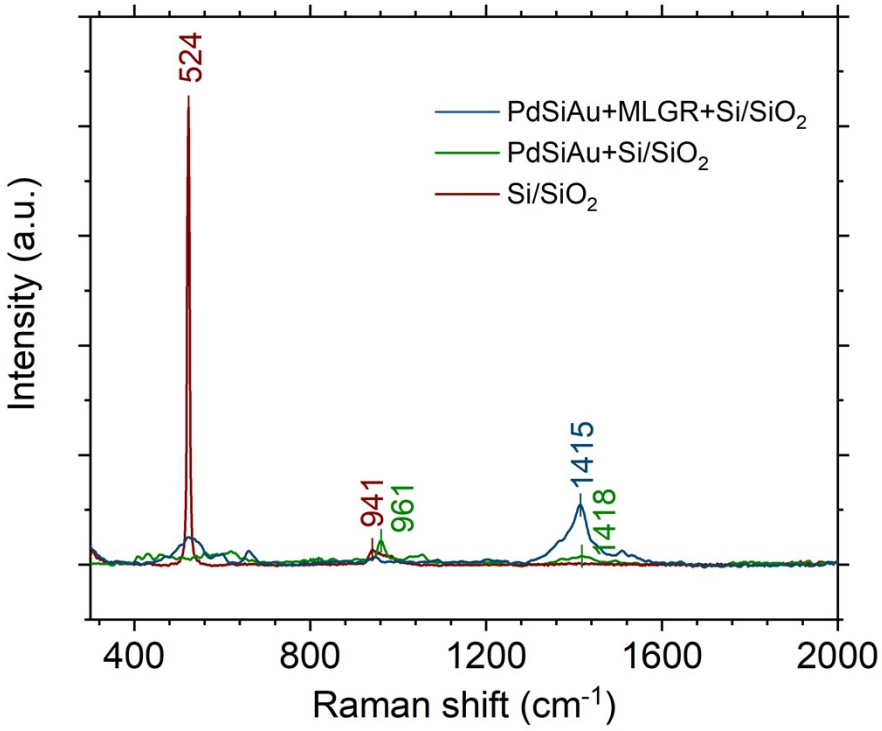

Fig S2. Raman spectroscopy of MLGR+PdSiAu+Si/SiO_2, PdSiAu+Si/SiO_2 and Si/SiO_2 showing the full spectra.

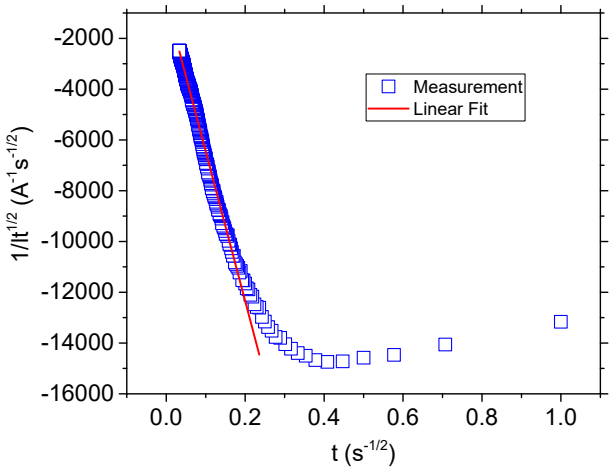

Fig. S3. Plot of $1/It^{1/2}$ vs. t for MLGR+PdSiAu+Si/SiO_2. The open blue squares and the red line depict measured data and the best linear fit. The slope and y-intercept of the linear fit correspond, respectively, to $\frac{R_\Sigma}{\Delta E}$ and $\frac{l\sqrt{\pi}}{\Delta Q\sqrt{D}}$ in equation 1. Linear fitting is applied to the region where the data are linearized until the saturation point.

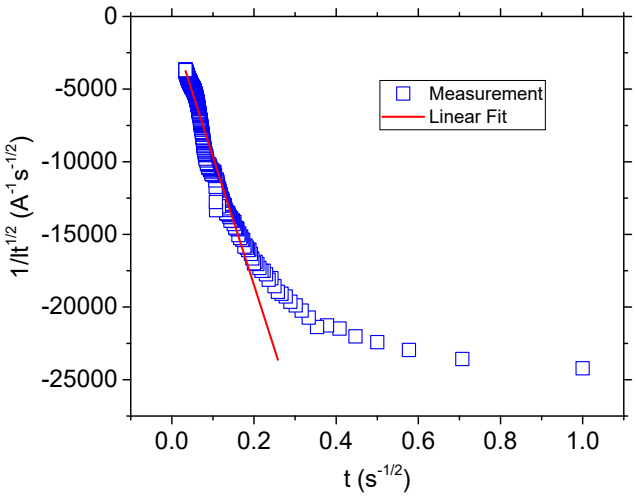

Fig. S4. Plot of $1/It^{1/2}$ vs. t for PdSiAu+Si/SiO_2. The open blue squares and the red line depict measured data and the best linear fit. The slope and y-intercept of the linear fit correspond, respectively, to $\frac{R_\Sigma}{\Delta E}$ and $\frac{l\sqrt{\pi}}{\Delta Q\sqrt{D}}$ in equation 1. Linear fitting is applied to the region where the data are linearized until the saturation point.

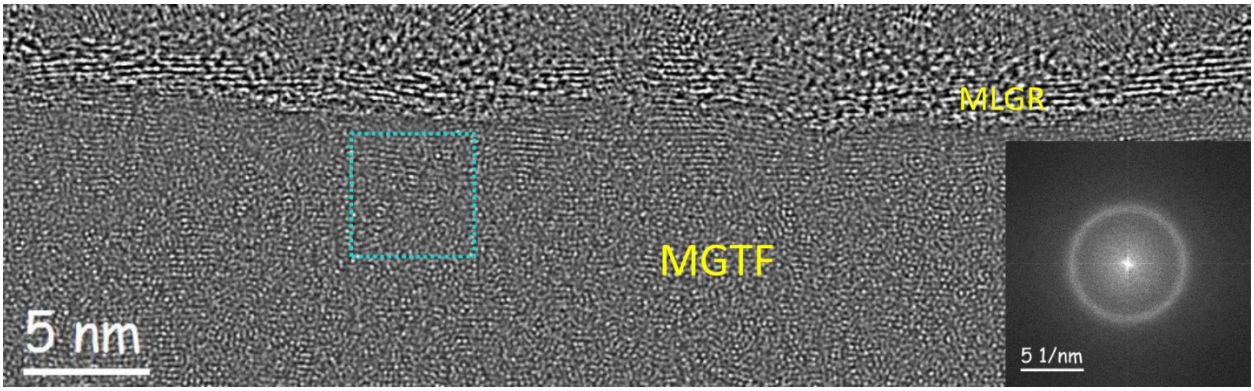

Fig. S5. HRTEM imaging of the as-sputter deposited MLGR+PdSiAu layers and FFT pattern of the region indicated by the cyan square.

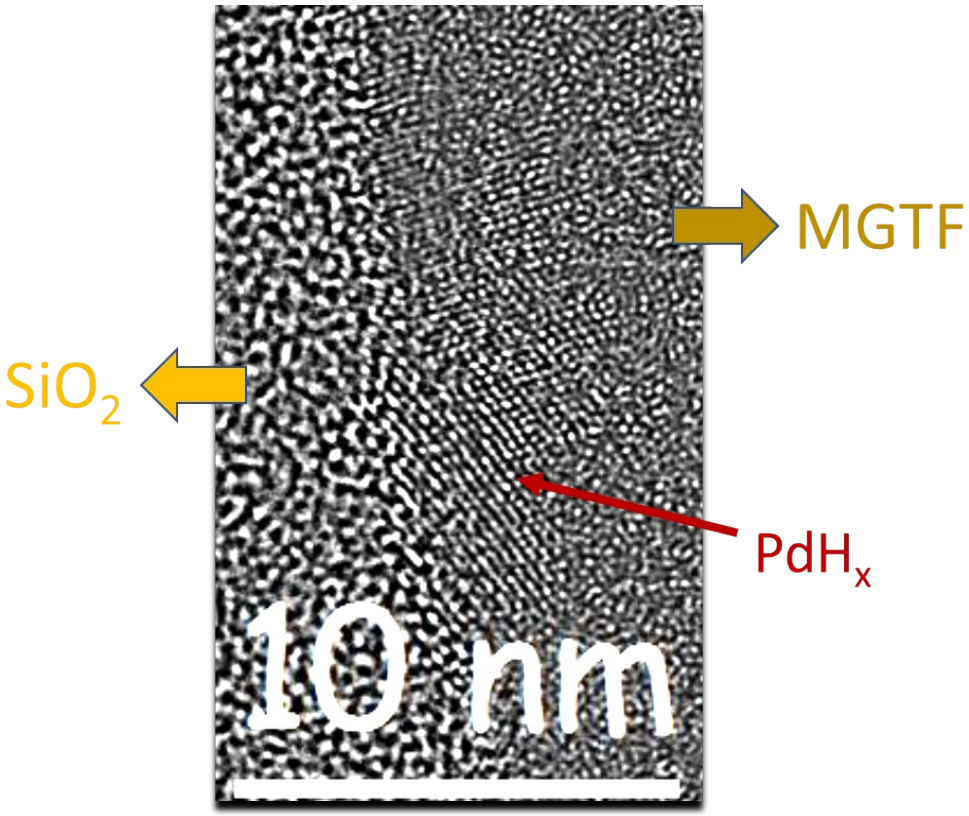

Fig. S6. Close-up HRTEM image of the MGTF - Si/SiO_2 interface showing PdH_x nanocrystals.

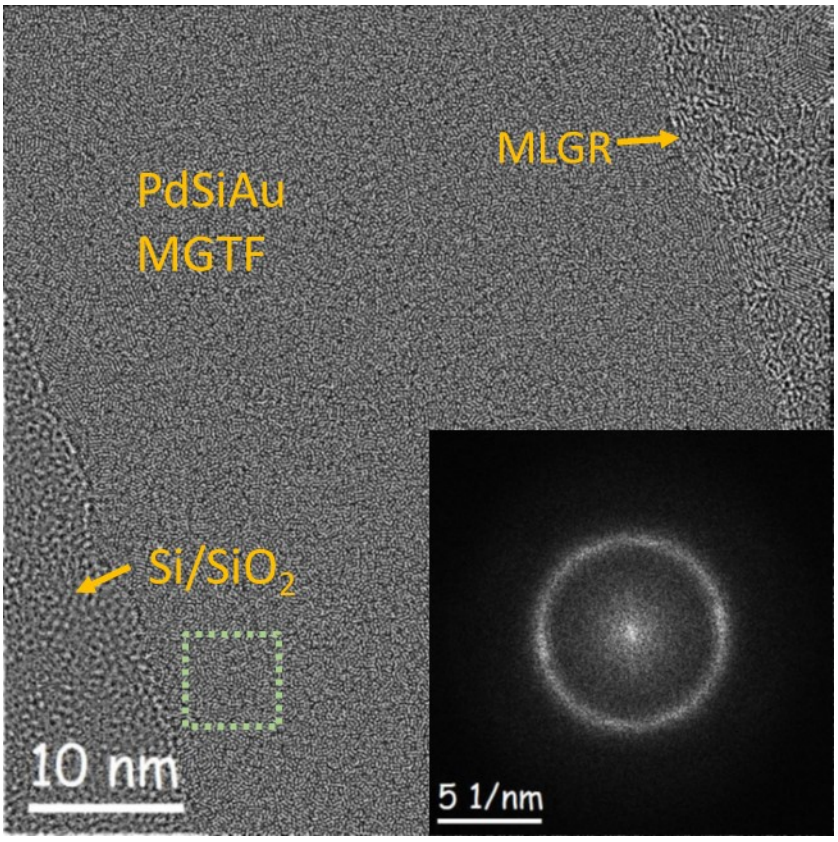

Fig. S7. HRTEM imaging of the entire layer of the as-sputter deposited MLGR+PdSiAu layers on Si/SiO_2 substrate and FFT pattern of the region indicated by the light green square.

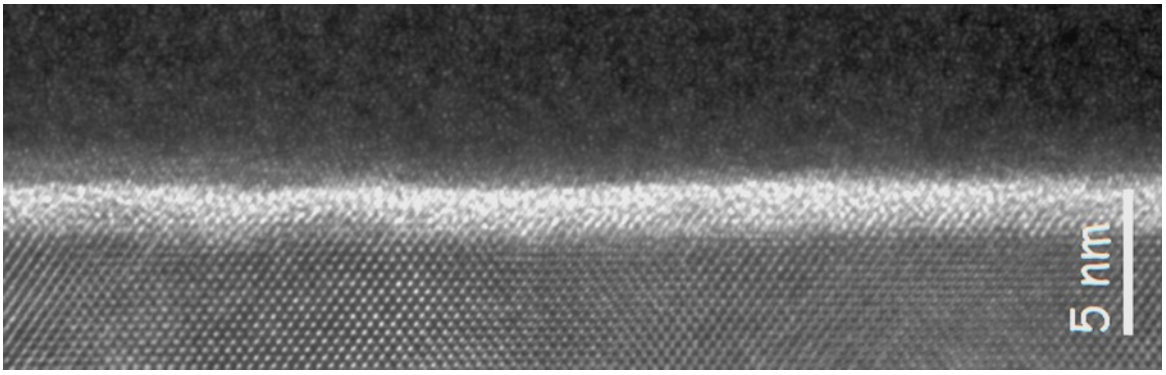

Fig. S8. HRTEM imaging of the PdSiAu MGTF and Si/SiO_2 interface

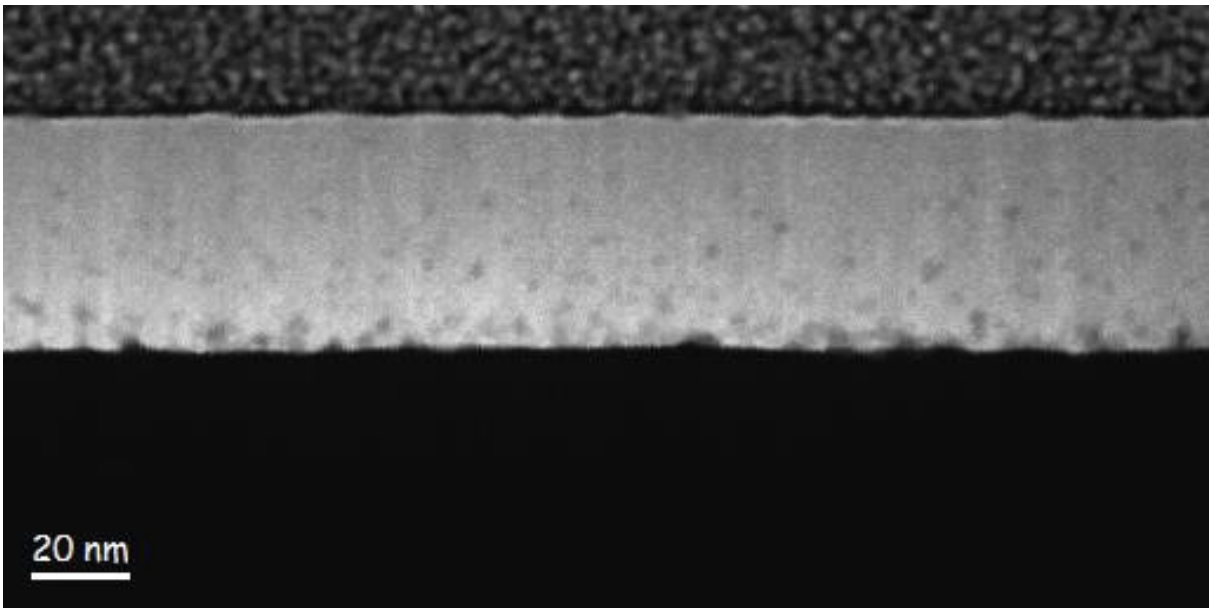

Fig. S9. HAADF imaging after hydrogenation of MLGR+PdSiAu+Si/SiO_2; scattered black regions correspond to nanovoids formed during hydrogen-metal interactions.