Supporting Information for

Structural transformation of h-BN overlayers on Pt (111) in oxidative atmospheres

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Figure S1. Growth of h-BN domains on Pt(111). (a) LEEM image and (b) LEED pattern (50 eV) of h-BN domains grown on Pt(111). The Pt(111) surface was exposed to $5 \times 10^{-8}$ Torr borazine at 800 °C for 20 min. The start voltage is 1.5 V. Within sub-monolayer coverage, monolayer h-BN islands form with the domains size around 20 μm and micro-region low energy electron diffraction (μ-LEED) measurements made on the different domains show the same satellite diffraction spots characteristic, indicating that there is only one orientation of h-BN overlayer with respect to the Pt(111) surface.
Figure S2. (a) LEEM images and (b) I-V curves acquired before and after the full layer h-BN/Pt(111) surface exposure to $1 \times 10^{-6}$ Torr $O_2$ at 400 $^\circ$C for 60 mins. The start voltage is 2.0 V. The inset is the $\mu$-LEED pattern acquired from $O_2$-treated h-BN/Pt(111) surface.

LEEM images show that the full h-BN layer remains unchanged when treating in $1 \times 10^{-6}$ Torr $O_2$ at 400 $^\circ$C for 60 mins. I-V curves and LEED patterns recorded from the surfaces before and after the treatment are nearly identical. These results elucidate that the full layer h-BN cannot be intercalated by oxygen, which is in contrast with the facile intercalation and oxidation of h-BN islands under the same condition.
Video S1 LEEM video of h-BN islands oxidized in $O_2$. Oxidation conditions: temperature = 400 °C, $P(O_2) = 1 \times 10^{-6}$ Torr. Image conditions: STV = 2.0 V, FOV = 50 μm. The whole oxidation process lasted for 21 min.

Video S2 PEEM video of full layer h-BN intercalated in $NO_2$. Intercalation conditions: temperature = 140 °C, $P(NO_2) = 5 \times 10^{-7}$ Torr. Image conditions: FOV = 50 μm. The whole oxidation process lasted for 2 min 30 s.