Supporting information for:

Pb intercalation underneath a graphene layer on Ru(0001) and its effect on graphene oxidation

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**Figure S1.** An in-situ LEEM video acquired from a graphene/Ru(0001) surface subjected to Pb deposition at 180 °C (field of view = 50 μm; start voltage =1.8 V). The whole time scale is 300s. The large island is graphene with sector shape. The video can be downloaded from the website:

[http://fruit.dicp.ac.cn/images/Jinli1-Figure S1 Pb intercalation.gif](http://fruit.dicp.ac.cn/images/Jinli1-Figure S1 Pb intercalation.gif)
Figure S2. An in-situ LEEM video recorded from the Pb-intercalated graphene/Ru(0001) under $5 \times 10^{-8}$ torr O$_2$ and at 700 °C (field of view = 50 μm; start voltage = 4.1 V). The whole time scale is 240 s. The islands are intercalated graphene sheets with sector shape. The video can be downloaded from the website: [http://fruit.dicp.ac.cn/images/Jinli1-Figure S2 Pb-intercalated graphene O etching.gif](http://fruit.dicp.ac.cn/images/Jinli1-Figure S2 Pb-intercalated graphene O etching.gif).
Figure S3. An in-situ LEEM video recorded from the graphene/Ru(0001) under $5 \times 10^{-8}$ torr O$_2$ and at 700 °C (field of view = 50 μm; start voltage = 9.8 V). The whole time scale is 97 s. The islands are monolayer graphene sheets with sector shape. The video can be downloaded from the website:
http://fruit.dicp.ac.cn/images/Jinli1-Figure S3 graphene O etching.gif.