Supplemental Materials for: Hydrocarbon Contamination of TEM Holders

Quantified and Mitigated with Open-Hardware, High-Vacuum Bakeout System

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**Figure S1.** XPS spectra of a carbon film grid (TedPella #01844) that has gone through 10 pumping cycles (each about 90 s) in a JEOL 2100F TEM equipped with ACD, compared with a clean out-of-box grid of the same type and the JEOL vacuum grease. (a) Wide scan. (b) C 1s spectra. (c) F 1s spectra. The F 1s peak appears on grid after introduction into microscope (10 pumping cycles) and is associated with the accumulation of high-vacuum greases.

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**Figure S2.** RGA spectrum of a TEM holder that undergoes chemical and plasma cleaning.

Chemical cleaning with alcohols introduces organic peaks that are characteristic of acetone.

These alcohols are effectively removed after 6 hours in manifold. Plasma cleaning does not

affect carbon levels significantly. The spike of species in the range 16 – 18 amu is due to

contact with ambient air during holder transfer. The caveats of traditional cleaning methods can

be remedied with high-vacuum storage.



**Figure S3.** Design of custom pipe flange to fit a JEOL TEM holder. The flange is of type ConFlat (CF) with mini side port made compatible with Type-C 9 pins electrical feedthrough from MDC Vacuum.



**Figure S4.** Optional dummy holder for unused JEOL ports on manifold.