

Figure 1. QCM trace for a standard atomic smoothing process with NHC. Inlay highlights the saturative behavior for the first pulse. Pulsing windows are shaded green, with pulsing recipe in the top right.



Figure 2. AFM roughness measurements for QCM crystals with optically polished Au electrodes. Top row of figures show 2D maps, Bottom row show height histograms with inlayed 3D maps for a A/D) blank surface with no thermal or NHC treatment, B/E) surface heated under vacuum C/F) surface treated with 4x(2hr pulse, 5 hr N₂ purge) of NHC heated under vacuum.

References

- (1) Chu, E.; Luo, Y.; Gupta, P. Design Impacts of Back-End-Of-Line Line Edge Roughness.
- (2) Krishnan, M.; Nalaskowski, J. W.; Cook, L. M. Chemical Mechanical Planarization: Slurry Chemistry, Materials, and Mechanisms. *Chemical Reviews* **2010**, *110* (1), 178–204. https://doi.org/10.1021/cr900170z.
- (3) Li, Y. X.; French, P. J.; Wolffenbuttel, R. F. Plasma Planarization for Sensor Applications. J. *Microelectromech. Syst.* **1995**, *4* (3), 132–138. https://doi.org/10.1109/84.465122.
- (4) Crudden, C. M.; Barry, S.; Ragogna, P.; Singh, I.; Veinot, A. J.; Goodwin, E. R.; Gordon, P. G.; Zhang, T.; Mcbreen, P.; Lomax, J. Method of Selective Deposition of Small Molecules on Metal Surfaces, October 26, 2023.

https://patentscope.wipo.int/search/en/detail.jsf;jsessionid=EB96F87A5749C278B7CA2578F4DCF164.wap p1nA?docId=WO2023201437&_gid=202343 (accessed 2024-02-02).