

NanoWestern



Western
Science

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Dear Colleagues, dear Western Nanofabrication Facility Users,

It has been 20 years since the opening of the Western Nanofabrication Facility, spearheaded by Prof. Ian Mitchell! The Western Nanofab was the first of its kind in Canada 20 years ago and since its inception many universities have followed our steps.

To celebrate this anniversary, we will have an open day event on Tuesday October 17th. Please plan to attend and ask your postdocs, students and HQP to attend to learn how we function, to visit the facility, and to attend a few talks.

The Western Nanofabrication Facility provides training so that HQP avail themselves of all instrumentation operating in the fab, instrumentation that we have constantly maintained, upgraded or changed over these 2 decades.

Many projects are being conducting including industrial projects, geological observation and sample preparation, corrosion samples examined using focused ion beam, photonic components fabricated using electron beam lithography, thin film deposition to perform a variety of surface science experiments, sensors used in biomedical science or satellite assembly in clean room environment.

Our tools are focused on the fabrication and modification of materials rather than pure characterization which makes the Nanofab a very complementary facility to other facilities across our University.

Our fees have been kept at the lowest possible level and revenue constantly reinvested in maintaining and upgrading of our instruments and the class 100 and 1000 cleanroom fabrication space. Service work is also available making the best of our capacity in prototyping nano and micro-scale devices and facilitating the manufacturing of commercialized devices with our industry partners.

In order to learn more about what we offer, refresh your memory about our current capacity, discuss your instrument needs current or future or simply have a coffee with us while chatting about your projects, please join us on Oct 17th in PAB100 at 9 am. A full schedule of the days events and tour times will follow.

Free registration will be necessary for refreshments and tour organization. Mark your calendar and reserve your spot at:

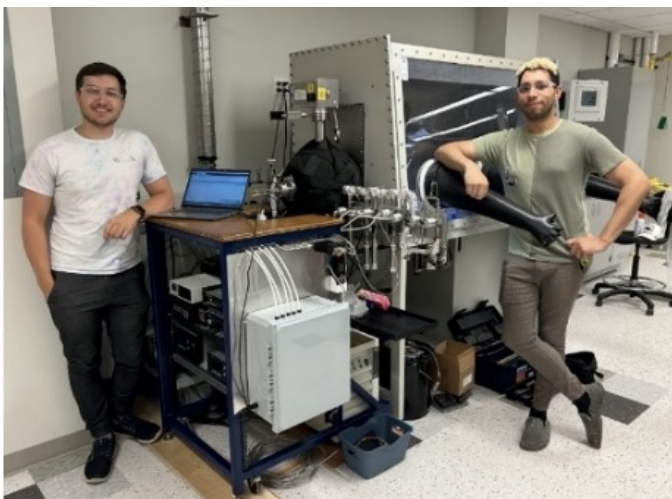
[Western Nanofabrication Open day \(Oct 17th 2023\) Tickets, Tue, 17 Oct 2023 at 9:00 AM | Eventbrite](#)

Sincerely yours,

François Lagurné-Labarthet

Western Nanofabrication Facility
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N-Heterocyclic Carbenes (NHCs) for Nanofabrication of Integrated Circuits for Microchips

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Integrated circuits are presently constructed using top-down strategies composed of multiple etching and lithographic steps. As the feature sizes of these devices further shrink to nanometre length scales, existing fabrication methods introduce defects which require further corrective steps and are rapidly becoming ineffective for industry needs. To meet future scaling requirements, bottom-up fabrication methods which leverage differences in local surface environment such as area-selective atomic layer deposition (AS-ALD) are promising but have been limited by the surface binding energies of adsorbates. N-heterocyclic carbenes (NHCs) have shown excellent bonding to metal surfaces and are presented herein as next-generation carbon-based small molecule inhibitor (SMIs) for the use in AS-ALD processes.

Area-selective vapour deposition experiments of NHC precursors were carried out onto wafers prepared by the Western Nanofabrication Facility. Metal deposited (Au, Cu, Ru, or Co) on Si wafers that were lithographically patterned with 20 or 100 μm metal bands were imaged using a LEO 1530 SEM (Figure 1 A). Wafers containing alternating lines of metal and dielectric materials enabled selectivity measurements based off of their respective ion yields collected from the Time-of-flight Secondary Ion Mass Spectrometer at Surface Science Western (SSW). Representative ToF-SIMS images of NHC-functionalized wafers are shown in Figure 1 B-C. The localization of deposition onto the metal bands highlights the potential of these next-generation SMIs and their use in microchip fabrication.

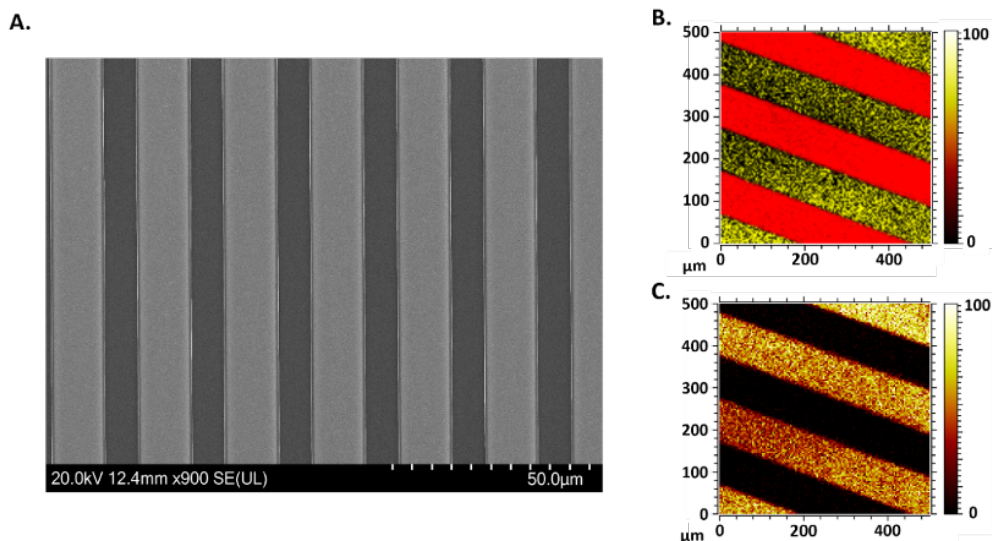


Figure 1. A) SEM image of patterned Co/SiO₂ Wafer of 20 μm lines. B) ToF-SIMS map image of Co⁺ (yellow) and Si⁺ (red) molecular ions. C) ToF-SIMS map image of NHC⁺ molecular ion (yellow).

[Cleanroom Intro](#)[SEM Intro](#)[Angstrom Deposition](#)[Sputter Deposition](#)[Trion RIE](#)[UV Ozone](#)[Tests & Quizzes](#)

Training Videos Available on OWL

The Western Nanofabrication Facility has a series of instructional videos and procedures for various instruments at the Nanofab. The videos and procedures are posted on OWL. They are available for all users of the Nanofab as well as PI's. When you log into OWL, you will see a "Western Nanofabrication Facility" site has been added to your available content. Our goal is to have online video tutorials available for all of the instruments in the cleanroom and wet lab. Please contact Tim Goldhawk tim.goldhawk@uwo.ca for OWL access.

The Western Nanofabrication Facility is a professionally staffed cleanroom designed to support education, research and industrial collaboration in the fabrication and characterization of structures and devices of nano and sub-micron scale. The Nanofab is a user-fee supported facility. It is open to academic, government and industrial users. The Nanofab is a "hands-on" facility where users are trained and supervised on the use of equipment and processes. Analytical and processing services are also available.

Western Nanofabrication Facility

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