Goldschmidt 2026 Abstract
https://doi.org/10.46427/gold2026.37674

Development of the Canadian Space Agency's protocols for characterizing airborne particles in cleanroom spaces to prepare for asteroid Bennu

JAMES FOWLER, PATRICK HILL, CAROLINE-EMMANUELLE MORISSET AND YAHYA MADEENAM

Canadian Space Agency

On October 20, 2020, the OSIRIS-REx mission collected a sample from the asteroid Bennu, which was delivered to Earth on September 24, 2023. In exchange for contributing the OSIRIS-REx Laser Altimeter (OLA) instrument, Canada will receive a portion of the Bennu sample. The Canadian Space Agency (CSA) is currently developing its Curation Facility, which will be the first laboratory of its kind in Canada (see the abstract by Morisset et al. at this conference).

The CSA has taken several steps to prepare its analytical techniques and procedures for operations of the cleanroom. This has included advancing and testing cleaning protocols (see the abstract by Hill et al. at this conference), developing monitoring procedures for inorganic contaminants (see the abstract by Williamson et al. at this conference), and characterizing the components that will come into contact with the asteroid sample (see the abstract by Williamson et al. at this conference). In addition to these activities, the CSA has also began developing its technique for characterizing airborne particles with a JSM-6010 scanning electron microscope (SEM). In doing so, the CSA aims to be able to develop a comprehensive understanding of the contaminants present within the curation facility's cleanrooms even when airborne particles are at a minimal level.

This presentation will highlight results of a series of test conducted in existing laboratory infrastructure at the CSA to characterize particles collected on silicon wafers using electron dispersive spectroscopy, secondary electron imagery, and backscattered imagery. The approach and results will be compared to similar procedures performed by NASA at Johnson Space Center for characterizing particles within their curation facilities (see *Organic Contamination Baseline Study* by Calaway et al. 2014) to ensure the CSA is well prepared for operations. The CSA is also aiming to further quantify the composition of the particles by comparing to Vapor Phase Decomposition Inductively Coupled Plasma Mass Spectrometry (VPD-ICP-MS) and Gas Chromatography-Mass Spectrometry (GC-MS) analysis of silicon wafers placed in the same environment.