Goldschmidt 2022 Abstract
https://doi.org/10.46427/gold2022.10754

Pressing Vinyl: Building a “living inventory” of the contaminant fingerprint of vinyl gloves and low-linting clean lab wipes

HILARY LEWIS AND BRANDON MAHAN

James Cook University

Presenting Author: hilary.lewis@my.jcu.edu.au

Exogenous contamination from clean lab consumables is of critical concern across trace element and isotope geochemistry. Advances in technology have resulted in increased instrument sensitivity, and subsequently reduced sample/analyte masses required to conduct measurements. As such, recent work has revitalized the scrutiny of clean lab paraphernalia to characterize their potential contaminant contribution(s) (contaminant “fingerprint”), with much of this effort focused on the release of contaminants from various types of gloves (eg. latex, nitrile and vinyl).

Expanding upon this, we have determined the contaminant fingerprints of over 40 elements in various brands of vinyl gloves (previously determined as the cleanest) and in other glove types for reference, and the same for various types and brands of low-linting clean lab wipes. A simple “dip test” was devised in which 10 mL of 2% double-distilled nitric acid (the common carrier phase for solution-based elemental/isotopic analyses) was prepared and added to pre-cleaned 50 mL centrifuge tubes. Subsequently, the index finger of each glove, (raw and after rinsing in Milli-Q water, separate tests), or a roughly 5 cm x 1 cm strip of each wipe, was dipped into this solution for approximately one second to simulate the occurrence of accidental contact with sample solutions. Solutions were then analyzed by TQ-ICP-MS to determine the concentration and mass release of elements.

Glove results corroborate that vinyl generally has the smallest contaminant fingerprint, yet high internal variability in contaminant fingerprints was found between vinyl glove brands. The efficacy of rinsing in Milli-Q water varied, however up to a ten-fold reduction in contaminant release occurred for some brands. Likewise, low-linting wipes were found to be highly variable in their contaminant fingerprints, with specific types/brands standing out as superior alternatives to conventional brands such as Kimtech Kimwipes®. Overall, these results illustrate that gloves and wipes can contribute significant contamination to analyte masses. Moreover, results highlight a need for wholesale characterization of contaminant fingerprints, and careful selection of consumables for work with low sample/analyte masses.

We are currently accepting samples from international labs and collating data into a continually updated “living inventory” that will be available by request or QR code.