ENVIRONMENTAL EFFECTS ON SPACE WEATHERED LIZARDITE GRAINS. N. M. Ozdowski[1], I. J. Marrs[1], M. R. Salvatore[1], C. A. Thomas[1] and M. J. Loeffler[1,2], [1]Department of Astronomy and Planetary Science, Northern Arizona University, Flagstaff, AZ 86011, [2]Center for Materials Interfaces in Research and Applications, Northern Arizona University, Flagstaff, AZ, 86011

Introduction: The surfaces of airless bodies in our Solar System are continually bombarded with solar wind ions and micrometeorites. The various surface-altering processes that planetary bodies experience are collectively referred to as space weathering [1]. When observing and studying planetary bodies, it is vital to understand the extent to which space weathering can affect the chemistry and mineralogy of the studied object. Further, in light of recent sample return missions (OSIRIS-REx, Hayabusa 2) from near earth asteroids, understanding the ways in which sample preparation and handling methods can chemically alter samples is vitally important.

Previously Cantando et al. [2] demonstrated that soaking olivine samples in distilled water after irradiating them with low-energy ions resulted in substantial magnesium depletion near the mineral surface. We are interested in determining whether similar depletion would be observed in other silicates that are expected to be present on carbonaceous asteroids. In this study, we focus on lizardite, which is a member of the serpentine mineral group.

Methods and Results: All experiments were performed in a PHI 5600 surface analysis system that has a base pressure of ~10^{-9} Torr. We performed analysis on ~3 mm lizardite grains using X-Ray Photoelectron Spectroscopy (XPS). After initial XPS analysis, the grains were irradiated with 4 keV helium ions to a pre-specified fluence. After irradiation, the grains were removed from the vacuum system and soaked in distilled water, after which they were reintroduced into the vacuum system for follow-up XPS analysis. In this presentation, we will present results on how the Mg:Si ratio changes as a function of ion fluence and soak time. We expect the results to give us a better understanding of how sensitive these phyllosilicates are to both ion irradiation and interaction with water. These results may both have implications for the handling of extraterrestrial samples and may give insight into whether there are certain characteristics that could indicate the presence of liquid water at any point during a primitive body's evolution.

Acknowledgments: This project was funded by Project ESPRESSO, a SSERVI program at SwRI.

References:

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[2] Cantando E. D., Dukes C. A., Loeffler M. J., Baragiola R.A., (2008) *JGR, 113,* E09011.