Title: Synthesis of Simulated Lunar Highlands Minerals. Cooper Howard[1], Holly Shulman1,[2], Doug Rickman[3], Jennifer Edmunson[4], Mike Effinger[4]
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Introduction: An important aspect of working towards permanent habitation on the lunar surface is developing a suitable lunar regolith simulant for testing that will be producible for years to come. Current simulants are mined materials. High quality simulants appropriate for the near-term NASA landing sites are in short supply. [1-3]. The development of an industrially producible, tailorable simulant is an important challenge. Manufacturing synthetic minerals enables the control of geochemistry beyond what can be achieved from natural rocks. In addition, the non-lunar contaminants invariably found in weathered or metasomatized terrestrial mined materials can be avoided. Up to of 98% of the mineral constituents of lunar regolith are comprised of four minerals; olivine, high calcium plagioclase, clinopyroxene, and orthopyroxene[4]. In this work, with an approach different from the pioneering work of Weinstein et al. [5], laboratory synthesis of these minerals has been demonstrated with scalable methods. This endeavor focuses on developing and improving the fidelity of synthetic highlands simulants. Scale-up and potential for large-scale production methods are currently being explored by utilizing existing industrial capabilities. Leveraging existing facilities and manufacturing methods which are currently producing multi tons of granular abrasives, to produce synthetic simulants, will ensure supply availability well into the future. A summary of this effort to date will be presented.

References:

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