
TcSUH Bi-Weekly Seminar

Lunar Regolith: Difficulties and Resources for Lunar Colonization



Prof. James Meen

Associate Research Professor, Department of Chemistry; TcSUH
PI

Thursday, March 28, 2019

Room 102, Houston Science Center
12:00 p.m. – 1:00 p.m.

ABSTRACT: The Moon (as well as other airless planetary objects) is covered by a layer of fine-grained, reworked rock, a regolith. On the Moon, this is 5-10 m thick and has a porosity of $\approx 50\%$. The precursor rocks were the basalts of the maria and the coarse-grained feldspar-rich rocks of the highlands which were excavated by meteorite impact and so the regolith ranges down in grain size to the nanoscale. As much of this material is silicate dust, the amount of potential damage it can do is considerable. The dust can block filters, scratch steel, damage motors, and cause health issues.

For as much as 4 billion years, the regolith has been subject to impacts from micrometeorites and from solar wind and cosmic rays. The continued melting, mixing, and sputtering (collectively “gardening”) has produced phases that were almost certainly not present in the precursor rocks and some were plausibly formed by vapor-phase reactions. Consideration of the thermal reduction processes of the regolith leads to the conclusion that industrial melting under equilibrium conditions can produce oxygen and several metals from the regolith in amounts suitable for construction of a lunar base. The details of such in situ resource utilization need to be mapped out experimentally. Some initial experiments that indicate the feasibility of the overall process will be discussed.

BIO: Jim Meen completed his first degrees in England before completing a doctorate at Penn State. After working at University of North Carolina at Chapel Hill, he came to the University of Houston and has been part of TcSUH and a Chemistry Faculty member since 1990. He served on the board of the Applied Superconductivity Conference from 2000 until 2018 as Educational Outreach Director.

RSVP by Wednesday at Noon to bdherndo@central.uh.edu for Vietnamese sandwiches.

Persons with disabilities who require special accommodations to attend this lecture should call (713) 743-8213.
