

Formulation of alkali-activated regolith for lunar construction

With a revived interest in space exploration, space agencies have scheduled manned missions to the Moon, with the final goal of planning the development of human settlements. To achieve this goal, it is essential to meet the specific requirements for lunar construction, and to prioritize environmental and economic sustainability. To this aim, the ISRU (*In Situ Resource Utilization*) approach envisages a local sourcing of raw materials needed for construction. The GLAMS - Geopolymers for Lunar Additive Manufacturing and Sensing - project explores the exploitation of lunar regolith for the formulation of alkali activated binders, used for the production of building units by means of additive manufacturing.



Luca Valentini is an associate professor at the Department of Geosciences of the University of Padua, and the PI of the GLAMS (Geopolymers for Lunar Additive Manufacturing and Sensing) project. His research interest is focused on the local sourcing of raw materials for sustainable construction, especially in the developing economies of Sub-Saharan Africa.

Foam production from geopolymeric slurries

The presented work is part of the GLAMS - Geopolymers for Lunar Additive Manufacturing and Sensing - project, funded by the Italian Space Agency, and aims at the production of porous materials obtained from foams generated by slurries based on lunar regolith, formulated according to IRSU (In Situ Resource Utilization) strategy suitable to obtain structural materials for the utilization in a not so far lunar colonization.

The study here presented concerns the formulation of foamed geopolymers composed by a regolith simulant (LMS-1D) powder and proper surfactants to be utilized for the production of porous concrete appropriate for dealing with the harsh lunar conditions, resistant to micro meteorite impact and optimized for thermal insulation.

Eva Santini. Researcher at ICMATE since 2004, she has recognized experience in colloidal science, specifically in the interfacial properties of surfactant systems in the presence of nanoparticles and their correlation with the formation of foams and emulsions. This knowledge is applied to the production of solid porous materials obtained from liquid disperse systems.



Seminar “Science for Sustainable Development”

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[Registration link](#)