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IAF SPACE EXPLORATION SYMPOSIUM (A3)
Moon Exploration – Part 3 (2C)

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THERMAL CHARACTERIZATION OF SINTERED REGOLITH SIMULANT FOR THERMAL ENERGY STORAGE

Abstract

The Moon is currently on the main targets of future spaceflight activities. With an increasing focus being given to sustainable exploration of the surface, different technologies are under investigation in order to provide the required energy for short- and long-term missions using In-situ Resource Utilization (ISRU). In this study, an ESA funded project led by Sonaca Space GmbH (partners: BlueThink S.p.A., the German Aero-space Center DLR and OHB System AG as partners) is introduced with the objective of designing and analyzing a system, based on a technology capability of storing thermal energy for electricity production purposes. An innovative heat storage and electricity generation system is designed using regolith simulant as the heat storage medium. In this process, the stored heat is released after a defined time period for direct heating purposes. Furthermore, the direct released heat energy could be used as an input energy to run a heat engine for electricity generation. Following this idea, optimum manufacturing techniques and parameters are investigated in this study, in order to process the lunar regolith. Reviewing the available regolith simulants properties and conducting different sintering techniques are among the objectives of this project. Initially, lunar regolith simulant (JSC-2A) is sintered using conventional oven under ambi-ent and vacuum conditions. Samples for sintering in oven are prepared using regolith bulk simulant as well as simu-lant pressed at 255 MPa for 10 minutes. Similar experiments are performed with a mixture of JSC-2A + 20 wt.