DocumentID	241233
Vortragstitel	Experimental Setup for the Demonstration of thermal Processing of Lunar Regolith for the Extraction of Solar Wind Implanted Particles via a Solar Powered Cavity Receiver
Autoren	M. Pfeiffer, P. Hager, T. Dirlich
Preisträger	
Vortragssprache	englisch
Seiten	10
Veranstaltung	Deutscher Luft- und Raumfahrtkongress 2011
Veranstaltungsort	Bremen
Veröffentlicht in	Deutscher Luft- und Raumfahrtkongress, Tagungsband - Manuskripte, 2011; Seite 1093 - 1103; DGLR e.V.; Bonn; 2011
Stichwörter	ISRU
	Mond

Abstract

One of the enabling technologies in long-term perspective for human space exploration is in-situ resource utilization (ISRU). When dealing with the prospect of future manned missions to Moon and Mars the use of ISRU seems useful and intended. The activities presented in this paper focus on lunar ISRU. This basically incorporates both the exploitation of lunar oxygen from indigenious rock and the extraction of solar wind implanted particles (SWIP) from regolith dust. Currently the the Institute of Astronautics (LRT) is examining possibilities for the extraction of SWIPs, which may provide several gaseous components (such as H2 and N2) valuable to a human presence on the Moon. This experiment, LUISE (Lunar Isru Experiment), will comprise a solar powered thermal process chamber for regolith heating. The proposed thermal extraction chamber uses an insulated double wall cavity receiver for heating, with regolith being filled into the gap between the two walls. The goal is to assess the thermal behavior of regolith within the process chamber. An experimental setup with two cylinders stacked into each other has been developed and built. Heating is accomplished by a molybdenum heater located within the inner cylinder. The overall setup is exposed to high vacuum during the complete heating run. With this simplified geometry we will heat several hundred grams of JSC-1A, a widely used lunar regolith simulant, to a temperature of 1000°C. The data gained during the testing is used to determine the influence of regolith layer thickness, thermal connection between the inner and outer wall of the cavity on the heating duration until steady state, power demand and overall heating homogeneity within the regolith.