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NUMERICAL MODELLING AND EXPERIMENTAL GROUND CHARACTERISATION FOR
THERMAL REDUCTION OF LUNAR REGOLITH FOR OXYGEN EXTRACTION

Abstract

Space exploration is going to play a relevant role within the just started decade, with the Moon at its centre. Many activities are on going to enhance science of and from the Moon and to develop the fundamental technology to accomplish the challenging objectives the foreseen missions to our satellite need. Among those the capability to detect, extract and manipulate the in situ resources is central for humans back on the surface and more. Politecnico di Milano, in consortium with OHB-I and OHB-S, under an ESA financed study, is run-ning tests on a ground demonstrator for the specific carbothermal and hydrogen reduction processes for oxygen extraction from oxides in the lunar minerals. To accurately understand the process, Politecnico di Milano run a numerical modelling of the whole process steps and a comprehensive characterisation of the feedstock simulant. This allowed understanding the process in deep. The paper will go through the simulant characterisation approach and results, the process description and modelling, the lab plant description and the experimental test campaign results, obtained with the implemented plant.