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A REVIEW OF SINTERING TECHNIQUES FOR LUNAR REGOLITH SIMULANT

Abstract

The establishment of lunar bases has become one of the new goals of human lunar exploration, and the transportation cost between the Earth and the Moon is high. The in-situ construction of lunar bases on the in-situ resource utilization of lunar rock/lunar regolith (ISRU) is an inevitable choice for long-term large-scale construction of the lunar surface in the future. How to process lunar regolith into building materials with superior properties is an important challenge in the in-situ construction of lunar base. The sintering method can achieve self-curing of lunar regolith at high temperatures, without any external materials, and achieve 100In this paper, the research on lunar regolith simulant sintering is reviewed, including non-pressure sintering, hot pressure sintering, microwave sintering, laser sintering, solar sintering and spark plasma sintering. The advantages and disadvantages of each sintering technology were compared and analyzed, and the evaluation indexes included sintering speed, molding size, sintering sample performance, etc. Based on the existing research results, the main factors affecting the sintering process were summarized, and the influence law and mechanism of sintering factors on sintering molding were analyzed, including sintering temperature, heating rate, holding time, sintering pressure, etc. The key scientific issues that have not yet been solved on lunar regolith sintering are proposed, and the key points of work that should be carried out in the future were summarized. Based on the above review and analysis, the development prospect and application suggestions of lunar regolith sintering technology were proposed.