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**Bottom-up heating method for producing polyethylene lunar concrete in lunar environment****Jaeho Lee<sup>1</sup>, Ki Yong Ann<sup>2</sup>, Tai Sik Lee<sup>3,\*</sup>, Bahiru Bewket Mitikie<sup>4</sup>**

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**Abstract**

The Apollo Program launched numerous missions to the Moon, Earth's nearest and only natural satellite. NASA is now planning new Moon missions as a first step toward human exploration of Mars and other planets. However, the Moon has an extreme environment for humans. In-situ resource utilization (ISRU) construction must be used on the Moon to build habitable structures. Previous studies on polymeric lunar concrete investigated top-down heating for stabilizing the surface. This study investigates bottom-up heating with manufacturing temperatures as low as 200°C in a vacuum chamber that simulates the lunar environment. A maximum compressive strength of 5.7 MPa is attained; this is suitable for constructing habitable structures. Furthermore, the bottom-up heating approach achieves solidification two times faster than does the top-down heating approach.

**Keywords:** In-situ resource utilization (ISRU); polyethylene; Moon; construction; lunar concrete; human exploration

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