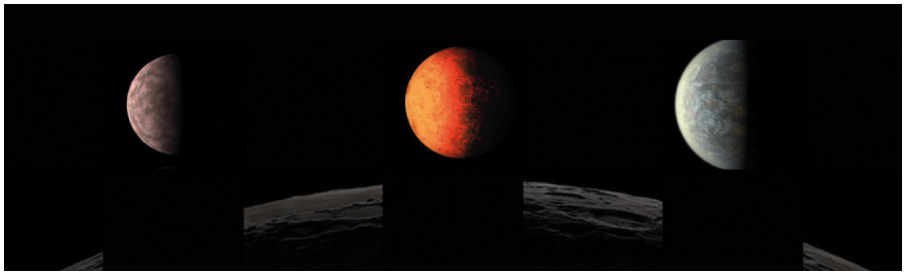

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Preparation of the natural lunar regolith simulant

Friday 24 October 2025 12:30 (1 hour)

The development of advanced technologies for lunar exploration, including rovers, drills, and sample collection systems, requires access to reliable regolith simulants. However, the availability of natural lunar regolith simulants is limited, and many existing substitutes do not fully reflect the chemical and mechanical properties of lunar soil. This study focuses on the identification and utilisation of Lower Silesian basalts as a raw material for producing a natural lunar regolith simulant. Comprehensive geochemical analyses were conducted to compare basaltic rocks and dust from mining sites in Lower Silesia with Apollo and Luna mission samples. The results indicate that Lower Silesian basalts show geochemical similarities to lunar basalts, particularly in aluminium, silicon, iron, magnesium, and calcium content, with only minor differences in sodium and potassium levels. Moreover, the particle size distribution of basaltic dust closely resembles that of fine lunar regolith, and its direct use without additional processing offers a cost-effective and sustainable solution by reducing mining waste. Preliminary research on the production of glass, a key component of lunar regolith, has been conducted. The ongoing research aims to refine production methods and test the geotechnical and mechanical properties of the simulant, providing a valuable tool for future lunar exploration technologies.

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