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DEVELOPMENT AND PROPERTIES INVESTIGATION OF TLS-01: THE FIRST THAILAND  
LUNAR REGOLITH SIMULANT

**Abstract**

In recent years, space science and engineering have become one of the most interesting research fields in Thailand. There have been many collaborations between private companies and universities. One important and interesting topic is lunar regolith simulant. Lunar regolith simulant is one of the most essential materials in the lunar in-situ resource utilization (ISRU) process that must capture the essential properties of actual lunar regolith. Thailand Lunar Simulant (TLS-01) is the first lunar regolith simulant in Thailand, recently developed by Space ZAB Company and affiliates. It was produced from Cenozoic intracontinental basalt in Chanthaburi-Trat volcanic province in eastern Thailand in which its geochemical compositions are suitable within the range of actual lunar regolith from Apollo missions. Direct shear testing was also used to analyse the mechanical properties. The geochemical prominence is considerably useful in further utilizations that focus on chemical properties such as biomining, cultivation and construction material. The mechanical properties, such as cohesion and friction angle of TLS-01 correlated well with previously developed lunar regolith simulants and returned samples from the Apollo missions. As such, TLS-01 exhibited key physical and chemical features that would be an invaluable tool for the upcoming lunar research program.