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SEARCHING FOR A MARTIAN SOIL SIMULANT IN UAE & AL HAJAR MOUNTAINS

Abstract

Recently, human space journeys to distant planets and moons have become the focus of attention for the space scientific community. With these interests, it became imperative for the scientific community to have a prior knowledge of how to create life support systems there. The future settlement of Mars is already a strategic plan for several countries and it will require to have varies essential requirements such as food production with conventional agriculture which will play a critical role for humans to live and work. To achieve this demand, it is important to understand the nature of the Martian soil. However, the unavailability of Martian soil on Earth is one of the main obstacles that hinder us to simulate agronomical production and soil geotechnical studies. Thus, it is of great significant to have sufficient amount of Mars' soil simulants that aid in having a prior knowledge about how the Martian soil will react. There are simulants already produced from Mojave Desert rocks based on older Martian soil data from remote sensing spectral analysis . However, the Curiosity and the Spirit rovers in Mars have given new data on Martian soils1. The unique characteristics of UAE and Oman geology which actually contain rocks similar to those of Martian soil such as basalt, harzburgite, gabbro and peridotites is one of the main reasons behind our implementation of this project which aims to create a simulant of Mars soil from various rocks in UAE and Oman. Our objective is to study those rocks and produce artificial soil by mixing them in appropriate amounts. This project will be done in the Advance Material Laboratory in the University of Sharjah. We have collected more than 10 samples from Hatta, Fujairah and Al Hajar mountains in Oman. These samples were processed for X-Ray Diffraction Analysis (XRD), X-

Ray Fluorescence (XRF) and grain size analysis (GSA). The expected outcomes of this project are to produce Martian soil analogue from rocks in UAE and Oman and study its properties such as thermal conductivity, physical properties, water/soil interaction and others. Succeeding on producing artificial soil from UAE will definitely support and enhance the development of research capacity in science and engineering towards innovation on Mars-agronomics.