OFFICIAL ABSTRACT and CERTIFICATION

Optimizing Strength and Impermeability of Martian Sulfur Concrete for Building Structures

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In this paper, I will discuss the effects of changing the ratio of sulfur and regolith in a mixture to make Martian Sulfur Concrete on its permeability and percent voids. This is important because NASA is planning on sending astronauts to Mars, and of a structure were to be built on the planet, it would need to be able to hold air but release some moisture. The samples were each measured out with respect to the percentage by weight based on the volume of the container that would be put into the oven. Then the complete samples were put through a series of tests to find the masses and densities in order to solve for the percent voids. The results demonstrated that the fifty fifty mixture made with sulfur chunks had the least percent voids, but was not statistically different than the fifty fifty mixture made with sulfur dust. However the sixty fourty mixture of regolith and sulfur respectively was significantly less than the mixture with sulfur chunks and approaching significantly less than the mixture with sulfur dust. Overall, the study demonstrates that when humans go to Mars, they must create a mixture that is either primarily sulfur or equally sulfur and regolith to make a structure that will hold air.

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