

Moon Brick Masonry

What the innovation is: New and highly durable, this innovative brick is composed of a lunar rock-like material mixed with powdered aluminum that can be molded into any shape, and can be used as the outer construction layer of dwellings in moon colonies. Almost as strong as concrete under various pressure tests, the one-square inch of the brick can withstand the gradual application of 2,450 pounds, nearly the weight of a Ford Focus. This strength would enable it to withstand an environment where gravity is a fraction of the pull on Earth. The more than year-long ongoing project has included studying the bricks reaction to solar radiation and their effectiveness as a construction material for lunar applications.

Why it is innovative: Strong and able to resist meteoroid impact and shield some solar radiation, the bricks can bring colonization of the moon closer to reality. The bricks could be used to build igloo-like dome components around initial moon based structures. The bricks can support one another in their dome shape, as the use of mortar is not necessary. The brick was developed by team of Virginia Tech college students under adviser Kathryn Logan, a professor of materials science and engineering and the Virginia Tech Samuel P. Langley Professor at the National Institute of Aerospace (NIA) in Hampton, Va. It won the 2008 In-Situ Lunar Resource Utilization materials and construction category award from the Pacific International Space Center for Exploration Systems (PISCES).

What it changed or replaced: The brick moves the United States closer to colonizing the moon with living environments that are safe from meteoroid impact and solar radiation.

Where and when it originated, has been used, and is expected to be used in the future: The brick was developed by Logan, Eric Faierson, a master's student in the materials science and engineering department; Michael Hunt, a materials science and engineering master's degree candidate; Brian Stewart, a materials science and engineering doctoral student, Susan Holt, a doctoral student in materials science and engineering;; Sharon Jefferies, a master's degree student in the aerospace and ocean engineering department; Scott Hopkins, an undergraduate mechanical engineering student ; and Michael Okyen, an undergraduate mechanical engineering student.. Logan's prior research entailed mixing powdered aluminum and ceramic materials to form armor plating for tanks funded through a Department of Defense contract. "I theorized that if I could use this kind of reaction to make armor, then I could use a similar type of reaction to make construction materials for the moon," Logan said. Lab tests thus far show the brick has a strong potential to be a viable tool on the moon's surface. Research is ongoing.

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