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THERMAL PROTECTION AND GAMMA RAY SHIELDING ON A 60KG LUNAR ROVER

Abstract

Multi-layer insulation was optimised through our insulation system which prevents electrical conductivity from dust, high doses of gamma rays on the moon and radiation shielding of drinkable water for astronauts and prevents micrometeorite(hyper-velocity) impacts. The insulation system will be made of lithium hydride as an equivalent of polyethylene as it reduces distances of particle radiation by 20 percent and its high hydrogen content. To shield from gamma rays, we have configured alloy layers made of lead (covering 40 cm) which can be used to prevent proximities of solar flares, concrete (covering the whole rover) and water concentrations covering the whole rover as well. We will scale down the lead concentrations to 0.25 mm as used in biomedical uses. luminized non-metals (Kevlar, Mylar, fiberglass, nylon, Nomex covered by an elastomer layer of VitonB50 and Kapton separated from Mylar by Dacron mesh) will also be mixed with some of the materials mentioned above as they were used on the Shuttle orbiter and were effective in preventing radiations. The entire MLI system will only be 3mm and its mass will be of 0.03 grams per square centimeters of covering the rover. This will be of 12 layers of aluminized materials and roughly 5 more layers of the alloy material mentioned above. Due to its poor electrical conductivity, electrostatically charged dust particles will be deflected and not intrude the systems. Our rover's insulation will be made of aluminized Mylar covering of 1 mm in thickness and has a high tear resistance. Three Kevlar straps will be wrapped around the module system .