ELECTROSTATIC CHARGING OF LUNAR DUST

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The chemical and mineralogical composition of lunar dust is well matched by two widely used lunar simulants: MLS-1 (Minnesota Lunar Simulant)[1] and JSC-1 (Johnson Space Center)[2]. However, their electrostatic charging properties were not compared to that of the lunar soil[3]. We have constructed an experiment, where individual dust grains can be exposed to a thermal plasma background and a flux of fast electrons. We have conducted experiments using glass, copper, graphite and silicon particles[4] and also grains from MLS-1 and JSC-1 lunar substitute materials[5]. We report our new set of measurements comparing Apollo-17, MLS-1 and JSC-1 samples. The secondary electron production from these materials, in the energy range of $20 \leq E \leq 90$ eV of the bombarding electrons, are similar. The measured secondary electron yield for the Apollo-17 sample was intermediate between MLS-1 and JSC-1 simulants, closer to that of MLS-1. On the day side of the Moon, photoelectron production becomes dominant. We are now modifying our plasma chamber to accommodate a solar UV simulant light source to examine charging due to photoelectron production.

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