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COATINGS ON METALS AND PLASTICS FOR LUNAR HABITATS AND EQUIPMENT

Abstract

The lunar surface is a harsh environment for future habitats and equipment. Especially lunar nighttime survival will pose a considerable engineering challenge. One of the key technologies for thermal engineers will be coatings, applied on various substrate materials. Although many known coatings can provide desirable thermo-optical properties in a lab environment, the use of these coatings in the lunar surface will be complicated in many cases. For example, lunar dust particles can become electrically charged, and the adherence of such particles on coated surfaces must be minimised. The extreme range of surface temperatures on the Moon leads the thermal engineer to prefer coatings with very low emissivity factor. Such coatings are highly sensitive to accumulation of dust. Technologies such as atomic layer deposition (ALD) and indium-tin oxide (ITO) coatings show promise for coating of metals and plastics, resulting in lower mass for the overall thermal system.