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SURFACE FIGURE PRECISION ANALYSIS RESEARCH ON NON-IDEAL THIN FILM SOLAR CELLS OF SPACE SOLAR POWER SATELLITE

Abstract

Film solar cells are widely used in space solar power satellite (SSPS). The absorbance of solar energy and transmission to electricity can determine the SSPS mission straightway. However, the thin film solar cells in space are different from the ground. Based on the buckling mode superposition of the membrane wrinkles theory, this paper consider inter stress in thin film solar cells, which has originated from the complex hot environment in orbit and error from truss. Furthermore this content has also analyzed the real surface figure precision (SFP) towards 100 m and megawatt level cells. Meanwhile, due to the non-stiffness connection by two cells, this paper has also presented the dynamic characteristic by finite element method (FEM). The relative location and vibration information has given. Moreover, based on the least square plane fitting method, the time-variant curve of SFP has shown. Accompanying to the microelement normal direction and absorbance, the actual energy loss in orbit has calculated, therefore the comparison including design plane, fitting plane and microelement normal direction has present different absorbance result. This work concept of film solar cells can potentially extend SSPS mission applications.