Abstract *(paper not available)*

Preparation and Anti-Deep-Charge Performance of Conductive PANI/PMMA Conformal Coating

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Internal charging has been considered the cause of many satellite anomalies. IT has become a serious problem because of the long-term degradation of the exterior surfaces coatings which increase the content of contamination on the surfaces, or lead to the damaging of materials. It is also due to their consequent electromagnetic noise damages electronic circuits in various kinds of apparatus. The intrinsic conformal coatings are composed of polymer dielectric materials. It always store charges on their surfaces, because of high energy electrons penetrate into spacecraft. Thus anti–deep charging conformal coating materials have been concernd to function as an electrostatic charge dissipation layer in space structure. As a conventional method, conducting material such as graphit, fine grains of matals or some kinds of semiconductors are usually introduced to reduce surface resistance of polymer materials. Unfortunately, these materials always need large component to built conductive system (up to 30 %), which leads to the instability of the coating and open circuit fault. In this work, the preparation and properties of conductive PANI/PMMA conformal coating was investigated. The Nano-polyaniline (PANI) was synthesized using the microemulsion polymerization method. Conformal coating is obtained by introducing PANI into polymethyl methacrylate (PMMA). The PANI and PANI/PMMA conformal coating were characterized by Fourier transformed infrared spectroscopy (FTIR), X-ray diffraction (XRD), transmission electron microscope (TEM) and thermogravimetric analysis(TGA). Electrostatic discharge ground simulation experiment was also performed to investigate the anti-deep-charge performance of PANI/PMMA conformal coating. All the samples were exposed in 1.0 MeV electrons and the anti-deep charge performance was tested by counting the discharging times. The results indicated that PANI/PMMA conformal coating with the resistivity of 1.16â011 ?• cm can release the static electricity in time,which can prevent the accumulation of energetic electrons in the circuit board and electrostatic discharge phenomenon effectively.

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