

UV spectroscopy of a Stardust reentry capsule as an artificial meteor

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On January 15, 2006, an airborne observatory NASA DC-8 was flying at the eastern edge of the Nevada state line to observe an artificial meteor formed by the Stardust Sample Return Capsule(SRC) during its entering the earth's atmosphere. The SRC observing campaign organized by NASA Ames Research Center, P.I.; Dr. Peter Jenniskens, was a great success. The SRC emission appeared at 9:57:00 UT that was just predicted time and grew up to be a bright fire ball on the night sky. Finally, the SRC had a soft landing in the US Air Force's Utah Test and Training Range at 10:10 UT.

A spectroscopic observation in the wavelength between 300 and 650 nm together with an optical imaging observation were performed using an Image-Intensified High-Definition TV camera and WATEC video camera, respectively. Since the front of SRC was covered with a heat shielding ablator composed of PICA(Phenolic Impregnated Carbon Ablator), carbon related emission such as C_2 , CN, which are most likely produced from the exterior of the carbon-carbon composite material, were expected. It was also predicted for a main part of emission from SRC in UV region that atmospheric thermo plasma such as N_2^+ , NH, OH emissions came out from the shock front reacted with the Earth's atmosphere.

In this paper, we present a first result of UV spectrum of an artificial meteor with its optical image. The details of physical and chemical processes of SRC compared with natural meteors will be discussed.