

Methodological Aspects of Optically Stimulated Luminescence (OSL) technique Applied to Space Dosimetry

E. G. Yukihiro, G. O. Sawakuchi, S. K. Guduru

Department of Physics, Oklahoma State University, Stillwater, OK 74078, USA.

There are now at least four different groups performing measurements in space using the Optically Stimulated Luminescence (OSL) technique: Landauer-Nagase (Japan), SCK-CEN (Belgium), NASA (USA), and Oklahoma State University (USA). With this increased interest in the OSL technique for space radiation measurements, it becomes important to review our understanding of the parameters influencing the OSL response. In this presentation, we will discuss some of the properties of aluminum oxide relevant for space dosimetry and the influence of experimental parameters such as the choice of: (a) detection filters; (b) readout mode (continuous *versus* pulsed stimulation); (c) signal used for analysis (total OSL signal *versus* initial OSL intensity); and (d) calibration procedure. These topics will be illustrated with recent results from the research on space and medical dosimetry carried out by the OSU group, including results from recent experiments performed using the HIMAC at NIRS (Japan) and from space exposures on board the ISS. The objective of this presentation is to review the available information concerning OSL, identify the needs in terms of research on material properties and technique, and stimulate the discussion on the optimum use of the OSL technique.

Acknowledgements: Some of the data presented was obtained in collaboration with Drs. Yukio Uchihori, Eric Benton, Nakahiro Yasuda, and Mr. Hisashi Kitamura. The authors also thank the discussions with Dr. Stephen W. S. McKeever.