

THERMOLUMINESCENCE (TL) AND OPTICALLY STIMULATED LUMINESCENCE (OSL) RESEARCH AT MCDANIEL COLLEGE

Dr. Vasilis Pagonis

Professor of Physics, McDaniel College

Email: vpagonis@mcDaniel.edu

B.Sc. in Physics: University of Athens, Greece, 1977

PhD in Experimental Solid State Physics:

Northeastern University, Boston, MA, 1982



CURRENT RESEARCH INTERESTS

1. QUARTZ MODELS FOR LUMINESCENCE DATING

During the past few years a new experimental technique based on thermally transferred OSL signals (TT-OSL). The method has the potential to extend the applicability of luminescence dating to quartz samples as much as 1 million years old. We have been developing suitable models to explain the origin of these signals, and to make improvements to the experimental protocols.

2. EXPERIMENTAL WORK ON TIME-RESOLVED OSL (TR-OSL)

TR-OSL is an experimental technique which measures directly the relaxation time of electrons from the conduction band into the luminescence center of wide band materials. At our research laboratory at McDaniel College we have been studying TR-OSL properties of quartz samples that have been heated and/or irradiated.

3. MODELING THE LUMINESCENCE PROCESSES IN QUARTZ AND ALUMINUM OXIDE

Understanding the luminescence process in quartz is of importance in many dating and dosimetry applications. Aluminum oxide ($\text{Al}_2\text{O}_3:\text{C}$) is one of the most widely used dosimetric materials whose luminescence process has many similarities, but also several important differences from the luminescence process in quartz. Our research focuses on developing models for luminescence processes in these materials, based on time-resolved OSL data available in the literature. In particular, the quantitative models under development are based on the phenomenon of thermal quenching in these two materials, and how it affects the luminescence intensity and luminescence lifetimes at higher temperatures.

CURRENT RESEARCH COLLABORATIONS

Modeling of TL/OSL phenomena in various dosimetric materials

This is our ongoing research collaboration with Dr. Reuven Chen (Tel-Aviv University, Israel), Dr. John Lawless (Pacifica Corporation, CA, USA), and Dr. George Kitis (University of Thessaloniki, Greece).

Experimental and modeling work on TR-OSL phenomena in quartz and Aluminum oxide

This is an ongoing project with the Nordic Luminescence laboratory (Denmark) and Dr. Makaiko Chithambo (South Africa).

Experimental work on TL/OSL phenomena in quartz

In this ongoing experimental collaboration with Dr. George Kitis (University of Thessaloniki, Greece), Dr. Nafiye Kiyak and Dr. George Polymeris (Isik University, Istanbul, Turkey) we study a variety of TL/OSL phenomena and dating protocols in quartz.