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TL measurements of in-vitro and in-vivo aged feldspathic porcelain

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Radiation accidents led to the birth of a new area, the accidental dosimetry. Thermoluminescence (TL) is a basic application tool in radiation dosimetry. Its main application is οn the determination of absorbed dose due to radiation events, over and above the normal background radiation. Several materials have been studied as potential accidental dosimeters [1]. This study is focused on materials which can be found assembled in a person, like biomaterials which are widely used in surgical and dentistry applications [2].

Feldspathic porcelain (FP) has been widely used in dentistry and is the most applied material as veneer layer in metal-ceramic restorations. The aim of the present work is to prove this material as a personal dosimeter. For this purpose, freshly prepared samples and in-vitro aged were examined, and the measurements were also applied in samples collected from patients. The majority of relevant scientific works are referred only to laboratory prepared samples [3]. It is a unique experiment that aims to compare in-vitro and in-vivo aged samples and their dosimetric properties. Additionally, characterization analysis (FTIR, XRD, SEM-EDS) was applied to every step of the aging, in order to examine if TL can be established as a characterization method of the aging progress of FP.

The preliminary thermoluminescence measurements on FP show that the glow curve is consisted basically of two glow peaks. The first one is a low temperature peak around 100 °C and the other one is a high temperature peak at 245 °C. The high temperature peak is suitable for dosimetric applications, while the low temperature peak shows characteristics which seem to be suitable for estimating the time elapsed from the end of irradiation (medical irradiation or accident with ionizing irradiation).

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