

In this presentation, we will focus on two types of scintillators with trapping of excited electrons for dosimetric purposes. The conventional type is thermoluminescent dosimeter (TLDs), in which the electrons are trapped in excited status when exposed to ionizing radiation, and when later heated, the trapped electrons then fall to their ground state with light emission. By measuring the light emitted one can determine the radiation dose previously received. In recent years, optically stimulated luminescent (OSL) dosimeter has grown to be an alternative to TLDs due to the convenience of its usage. The OSL dosimeters also trap excited electrons when exposed to ionizing radiation. Instead of heat, stimulation light is used to release the stored energy in OSL dosimeters. The intensity of the emitted light depends on the dose absorbed by the OSL dosimeters and the intensity of the stimulation light. Its sensitivity, reproducibility, precision in responding to accumulative dose and its energy dependence have also been studied in order to demonstrate its potential. We will discuss both TLDs and OSLDs with regards to their dosimetric properties and applications in radiation therapy dosimetry as well as in diagnostic imaging dose monitoring.

Learning Objectives:

1. To understand the basic principles of optically stimulated luminescent (OSL) and thermoluminescence (TLD) dosimeters.
2. To learn their physical properties and characteristics as dosimeters.
3. To compare the applications of OSL and TLD dosimeters in radiation therapy dosimetry as well as in diagnostic imaging dose monitoring.