

**Title: Development of polymer-based material doped with nanoparticles for radiotherapy dosimetry**

This project aims at developing a new generation of polymer-based material doped with nanoparticles (NPs) toward radiotherapy dose monitoring. In this approach, the dose deposited in the material is evaluated by the modification of one specific physico-chemical property of the polymer (transparency, color, etc...). Here, we expect to increase the sensitivity of the material by the incorporation of radiosensitizing nanoparticles in the dosimeter.

This project will be articulated around two main axes: NPs-doped polymer synthesis and its characterization under irradiation. Several kinds of polymers will be screened as well as several types of nanoparticles, in tight collaboration with the Laboratoire de Chimie Physique of Paris-Sud University. The NPs-doped polymers will be first thoroughly characterized in terms of transparency, homogeneity, stability, etc. Then, their dosimetry skills (reproducibility, sensitivity, linearity, dose, dose rate and energy dependence) will be evaluated under irradiation at the scale of the lab (X-ray tubes with keV energies) before being exposed to MeV beams with a medical accelerator (DOSEO platform at CEA Saclay). The objective of the project is to determine the best compromise between NPs incorporation and dosimetry response of the polymer.

This project will be realized in collaboration between several labs of the *CEA LIST* (Saclay) and the *Laboratoire de Chimie Physique* implanted at Paris-Sud University (Orsay).

**Formation:**

PhD in chemistry and/or material sciences

**Skills recommended:**

Material sciences, polymers synthesis, nanoparticles, composite materials.

**Contacts**

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