improved secondary electron yield by atomic layer deposition

General information

Organisation

The French Alternative Energies and Atomic Energy Commission (CEA) is a key player in research, development and innovation in four main areas : • defence and security, • nuclear energy (fission and fusion), • technological research for industry, • fundamental research in the physical sciences and life sciences. Drawing on its widely acknowledged expertise, and thanks to its 16000 technicians, engineers, researchers and staff, the CEA actively participates in collaborative projects with a large number of academic and industrial partners. The CEA is established in ten centers spread throughout France

Reference
SL-DRF-22-0289

Direction
DRF

Thesis topic details

Category
Condensed Matter Physics, chemistry, nanosciences

Thesis topics
improved secondary electron yield by atomic layer deposition

Contract
Thèse

Job description
Multipactor is a parasitic phenomenon that occurs in devices where a microwave is transmitted under vacuum such as electronic vacuum tubes for electron microscopy, resonant cavities and couplers for particle accelerators and microwave circuits. on board the satellites. It consists of an avalanche of electrons set in motion by a radiofrequency field which can cause, under certain conditions, a disturbance of measurements, damage or even destruction of RF devices.This phenomenon is directly linked to the emission of so-called secondary electrons from a material when it is irradiated with electrons. The secondary electron production yield (SEY for Secondary Emission Yield) is therefore a crucial parameter if we want to greatly reduce the multipactor phenomenon.This thesis project aims at the fundamental study of SEY of thin films synthesized by Atomic Layer Deposition (ALD). ALD is a thin film synthesis technique used in the microelectronics, photovoltaic, battery industries…, which allows unparalleled control of thickness and chemical composition down to the atomic level on complex surfaces. This deposition technique is therefore a remarkable tool for 1 / studying separately and in a controlled manner the impact of different alloys (chemical composition), and their thickness on the SEY and 2 / directly applying these optimized structures on 'real »RF devices. This thesis will be done in collaboration between CEA and ONERA. It combines at the same time a proven deposition technique, means of spectroscopic surface characterizations of peaks and numerical simulations.

University / doctoral school
PHENIICSParis Sud

Thesis topic location

Site
Saclay

Requester

Position start date
01/09/2022

Person to be contacted by the applicant

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