

Post-doc offer: PsD-DEN-19-0092

RESEARCH FIELD

Materials and applications / Engineering science

TITLE

External coating for the protection of SiC/SiC composite claddings in PWR environment

ABSTRACT

Accident tolerant fuels (ATF) fall into two categories depending on their technology readiness level. The first one regroups surface functionalized current claddings that are assumed to be fully mature earlier the second class constituted from alternative materials. SiC/SiC matrix/fiber composites belong to the second group and are presently the reference solution studied by the international community. Despite its exceptional behaviour at high temperatures, it is now admitted that SiC releases silicon oxide under conditions representative from the primary coolant in pressurized water reactors, which is limiting their right operation. In order to avoid this hydrothermal corrosion phenomenon, a metallurgical protective thin film exhibiting a stable behaviour in these conditions will be deposited on SiC/SiC composites thanks to an ionized physical vapor deposition process. Two essential aspects of the coating will be addressed by optimizing the deposition process. They will consist of the interface separating the composite substrate from its coating and the coating microstructure, so that the granted protection is maximized.

LOCATION

Département de Physico-Chimie
Service d'Etudes Analytiques et de Réactivité des Surfaces
Laboratoire d'Ingénierie des Surfaces et Lasers

START DATE

02/09/2019

CONTACT PERSON

Alexandre MICHAU
CEA
DEN/DANS/DPC/SEARS/LISL
CEA Saclay
91191 Gif-sur-Yvette
Phone number: +33 1 69 08 48 36
Email: alexandre.michau@cea.fr