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Joint ICTP-IAEA Workshop on Physics of Radiation Effect and its Simulation for Non-Metallic Condensed Matter | (smr 2359)

Monday 20 August 2012

Overview of non-metallic materials for fusion applications (part I) - Adriatico Guest House Giambiagi Lecture Hall (14:00-15:00)

In Fusion reactors a significant radiation field will be present. The ignited plasma will give rise to high energy neutron and gamma radiation fluxes, extending well beyond the first wall, together with an intense particle flux on the plasma facing materials. The radiation field will induce numerous different types of defects in the materials through displacement and ionization processes. In addition transmutation products from the nuclear reactions will build up with time representing impurity changes in the materials, as well as a source of possible activation. All these processes have very important consequences from the point of view of the machine operation, lifetime and reliability. Defect creation causes changes in the materials, and therefore in their properties. Radiation induced modification of the material properties is of course a technological problem, but is also an attractive phenomenon from the point of view of the basic physics and the understanding of the basic processes which occur in the materials subjected to a field of radiation. It is important to remember that the nature of non-metallic materials makes them highly sensitive to both ionization and displacement damage, with the result that the properties of interest may be severely modified even at low dose rates and for low doses, and that these materials are required in critical components of a number of different systems, such as high power RF windows (ICRH, ECRH), neutral beam injection (NBI) system, etc.. Hence changes in their properties may have serious consequences for the viability of the machine. Also ceramic breeders materials suffer severe degradation of their properties due to radiation.

time	title	presenter
14:00	Overview of non-metallic materials for fusion applications (part I)	SHEILA GONZALEZ