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

Friday 24 August 2012

Ongoing challenges in development of advanced nonmetallic materials for nuclear applications - Adriatico Guest House Giambiagi Lecture Hall (09:00-10:00)

This presentation will summarize some of the key fundamental obstacles to application of advanced nonmetallic materials in nuclear applications. These barriers are based on two general issues: low ductility and toughness of ceramics (which generally limits their applicability to nonstructural applications), and radiation-induced degradation of properties (e.g., electrical conductivity, optical transmission, fracturing due to anisotropic swelling, etc.). A variety of approaches are being utilized to mitigate these barriers and to enable broader use of nonmetallic materials in nuclear applications. For example, ceramic composites provide adequate engineered toughness for many structural applications, although robust engineering design rules for structural operation involving public safety still need to be developed. Appropriate selection of radiation-resistant materials (e.g., doped oxides for optical applications, or isotropic structures rather than hexagonal close packed structures for structural applications) is being pursued to enable broader use of nonmetallic materials for nuclear applications.

time	title	presenter
09:00	Ongoing challenges in development of advanced nonmetallic materials for nuclear applications	STEVE ZINKLE