1. Record Nr. UNINA9910298591403321

Autore	Bachiller Perea Diana
Titolo	Ion-Irradiation-Induced Damage in Nuclear Materials : Case Study of a-SiO and MgO / / by Diana Bachiller Perea
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2018
ISBN	3-030-00407-4
Edizione	[1st ed. 2018.]
Descrizione fisica	1 online resource (191 pages)
Collana	Springer Theses, Recognizing Outstanding Ph.D. Research, , 2190-5053
Disciplina	621.4833
Soggetti	Materials science Energy systems Nuclear fusion Nuclear energy Characterization and Evaluation of Materials Energy Systems Nuclear Fusion Nuclear Energy
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Introduction -- Part I Materials and Methods -- Studied Materials: a-SiO2 and MgO -- Ion-Solid Interactions and Ion Beam Modication of Materials -- Experimental Facilities -- Experimental Characterization Techniques -- Part II Ion Beam Induced Luminescence in Amorphous Silica -- General Features of the Ion Beam Induced Luminescence in Amorphous Silica -- Ionoluminescence in Silica: Role of the Silanol Group Content and the Ion Stopping Power -- Exciton Mechanisms and Modeling of the Ionoluminescence in Silica -- Part III Ion-Irradiation Damage in MgO -- MgO under Ion Irradiation at High Temperatures -- Ion Beam Induced Luminescence in MgO -- Conclusions and Prospects for the Future.
Sommario/riassunto	This thesis investigates the behavior of two candidate materials (a-SiO and MgO) for applications in fusion (e.g., the International Thermonuclear Experimental Reactor (ITER)) and Generation IV fission

reactors. Both parts of the thesis – the development of the ionoluminescence technique and the study of the ion-irradiation effects on both materials – are highly relevant for the fields of the ion-beam analysis techniques and irradiation damage in materials. The research presented determines the microstructural changes at different length scales in these materials under ion irradiation. In particular, it studies the effect of the irradiation temperature using several advanced characterization techniques. It also provides much-needed insights into the use of these materials at elevated temperatures. Further, it discusses the development of the ion-beam-induced luminescence technique in different research facilities around the globe, a powerful in situ spectroscopic characterization method that until now was little known. Thanks to its relevance, rigorosity and quality, this thesis has received two prestigious awards in Spain and France. .