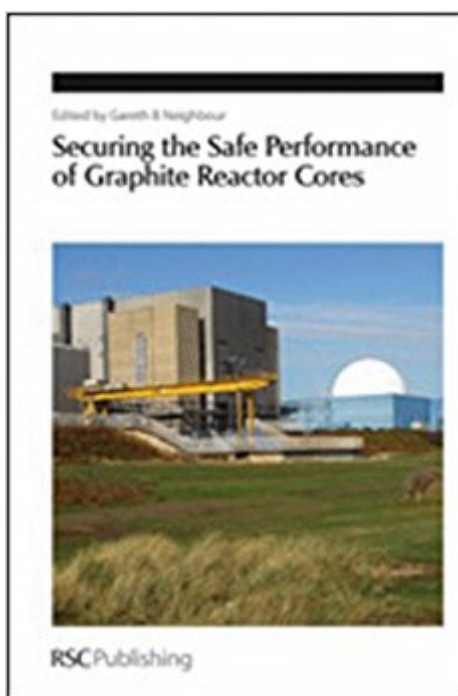


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Securing The Safe Performance Of Graphite Reactor Cores: RSC (Special Publications)



Synopsis

Nuclear power currently contributes some 20% of the electricity needs of the UK and is rising rapidly on the political agenda due to environmental and economic factors, and yet all but one of the UK's existing nuclear reactors is expected to close by 2023. The increasing emphasis towards nuclear power rests on security of supply and reducing carbon emissions. This comprehensive book provides an account of the recent advances in securing safe performance of graphite-moderated nuclear reactors both within the UK and abroad which underpin life extension whilst maintaining high levels of plant performance. These reactors rely on graphite as a moderator in the form of layers of interlocked graphite bricks which undergo complex changes when exposed over long periods to the effects of neutron irradiation and radiolytic oxidation. The objective of this book is to outline the current approaches in terms of assessment methodologies, surveillance and test methods, performance prediction, graphite reactor decommissioning, regulatory requirements and the relevance to future reactor designs. The book is a sequel to the successful RSC publication "Managing of Ageing Processes in Graphite Reactor Cores", but with the emphasis on the challenges for the future safe performance. It is hoped that the contributed papers will also help in the design, construction, operation and eventual decommissioning of the new generation of graphite-moderated reactors. Papers presented in the book represent contributions from the most eminent specialists in the field and reflect the UK's contribution over the past 50 years to graphite reactor technology that will remain significant for years to come, especially in the development of Generation IV designs. This seminal book is written in a way that takes the reader from fundamental knowledge to reactor operation in a straight forward and understandable manner - ideal for non-specialist as well as a unique reference for the specialist. It is fully illustrated to aid understanding and is relevant to a wide range of readers from policy makers to reactor operators.

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and out-of-core methods, e.g. irradiation experiments in a materials test reactor) " Prediction of the performance of the graphite core (including fundamental material properties, modelling graphite component behaviour and modelling whole-core behaviour) " Plant modifications (such as diverse shut down systems) " Graphite decommissioning (including on safe disposal of the graphite core) " Regulatory requirements " Future reactor designs This seminal book is written in a way that takes the reader from fundamental knowledge to reactor operation in a straight forward and understandable manner - ideal for non-specialist as well as a unique reference for the specialist. It is fully illustrated to aid understanding and is relevant to a wide range of readers from policy makers to reactor operators.

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