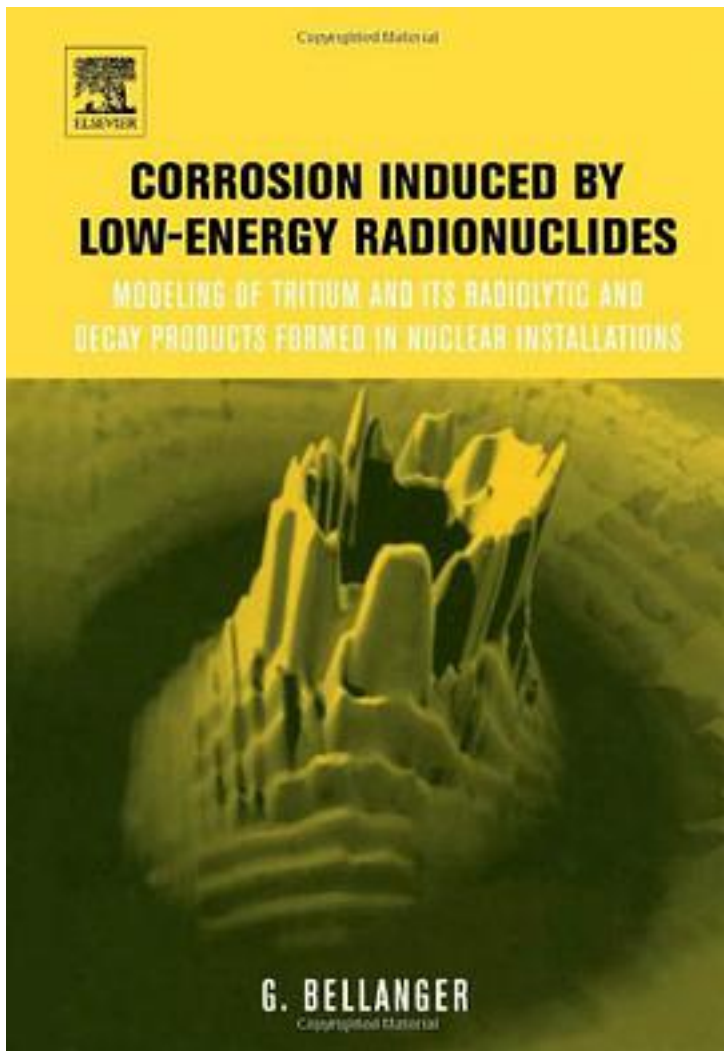


Corrosion Induced by Low Energy Radio-Nuclides



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Nuclear power plants emit radiation and particles across a range of energies. This radiation can cause corrosion to occur in critically important parts of the plant, which can lead to efficiency and safety problems. Gamma rays and neutrons have the highest energies and can break the metal bonds in interior metallic structures causing damage quickly and in easily monitored ways. Consequently these types of radiation and the best alloys to use to mitigate their effects have been extensively researched and their findings applied. However, the same is not true of low energy radiation which effects metal structures in a different way but can still cause appreciable and expensive corrosion. Low energy radiation degrades the passive oxide layers that protect metals. Without this protective layer the metals are easily corroded. This book uses tritium and tritiated water as models to describe the effects of low energy radiation on the corrosion of metals in these environments. Comprehensive coverage of the fields of liquid and gas flow, heat exchange, gas diffusion in materials, and of materials resistance to corrosion is ensures the reader has a full understanding of how these processes effect corrosion in nuclear installations. Such an understanding is essential for the efficient and safe running of all modern plant that uses radioactive material and this book is a critical reference tool for anyone involved in the nuclear power industry or metals research. It provides unique coverage of low energy radiation and its corrosive effects in nuclear installations. It provides coverage of basic scientific principles contributing to corrosion. It serves as an essential reference for the safe and efficient construction and operation of nuclear installations. It covers the applications in power generation, fuel reprocessing, military and civilian applications. This is the first book to present detailed analysis of nuclear corrosion by low energy nuclides. This is the most complete book available for those serious about understanding corrosion in all its aspects.

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目录:

[Corrosion Induced by Low Energy Radio-Nuclides_ 下载链接1](#)

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