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LOW-LEVEL MEASUREMENTS OF MAN-MADE RADIONUCLIDES IN THE ENVIRONMENT

Editors

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Lowlevel Measurements Of Manmade Radionuclides In The Environment

DP Hallahan



Lowlevel Measurements Of Manmade Radionuclides In The Environment:

Low-level Measurements Of Man-made Radionuclides In The Environment - Proceedings Of The 2nd International Summer School M Garcia-leon,G Madurga,1991-03-22 This volume gives an up to date account of the methods used in the detection of artificial radionuclides and their spread in the environment

Low-Level Environmental Radioactivity Richard Tykva,Jozef Sabol,1995-04-13 From the Introduction Low level radioactivity is related to those radioactive sources of ionizing radiation that are characterized by low activities Sometimes activity here does not represent total amount of radionuclides but rather their concentration In other cases the total activity may be quite high but we can measure only a relatively small portion of the material Low may have for different situations and circumstances not only considerably different meanings but also different absolute values as far as the activity or activity concentration is concerned For example one can refer to low activity in the case of radiocarbon dating where the concentration of ^{14}C is actually lower than its natural concentration and also in the case of radon monitoring where especially in mines or in some enclosed spaces its concentration may be several thousand times higher than the outdoor atural concentrations Emphasis is now being placed on the analysis of naturally occurring radionuclides in the environment or on the release of radionuclides from their different man made sources because liquid and aerial discharge level controls have become more rigorous In addition the applicability of low level methodology increases the extent of different radionuclide applications considerably Since individual radionuclides differ in their decay scheme and particles emitted as well in their energies there is no universal method for the accurate measurement of all radioactive sources Moreover there is usually a mixture of radionuclides in a sample causing some difficulties in a selective evaluation of a given radionuclide Due to the random nature of radioactive disintegrations the appropriate interpretation of the experimental results would be in most cases impossible without elaborate statistical treatment and evaluation of the data obtained Thanks to the availability of computer based instrumentation the measuring data can be in most cases processed and evaluated on line which makes it possible to control and optimize the experiment in order to extract the maximum amount of information carried by the detector response The purpose of this book is to provide an introduction to low level radioactivity assessment and to clarify the nature of its sources as well as the principal methods used in its measurement Our evaluation is concentrated on the present day aspects of low level methodology The book may be useful for all who need highly sensitive analysis of natural or artificial radioactivity both within and outside the nuclear field The attempt of this book is to summarize the sources of environmental radioactivity and their possible radiological impact in terms of resulting doses to the population and to present a sound review of the measuring methods and techniques for the evaluation of low level radioactivities encountered in both the environment and in a number of applications where radioactive sources are used as a means of obtaining important information

Man-Made and Natural Radioactivity in Environmental Pollution and Radiochronology Richard Tykva,Dieter Berg,2013-03-14 Radioactivity can be detected at

different levels in almost all objects all over the world including the human body This omnipresence of naturally occurring radioactivity is of immediate and crucial concern to people who work in the nuclear industry to state and local authorities responsible for environmental protection and control of nuclear weapons and to researchers as physics e g interaction in scientific and technological disciplines such of radiation with matter chemistry e g management of radioactive wastes biology Ce g radiation bioeffects and risks ecology e g remediation of environmental pollution electronics e g measurement instruments etc Unlike other environmental pollutants such as heavy metals and pesticides some other scientific disciplines for example archaeology hydrology and geology profit by the environmental radionuclides using methods based on their application in radiochronology The basic goal of this book is to examine the complex state of radioactivity in the environment including its sources and applications In principle there are two sources of environmental radioactivity namely man made and natural The authors of this book set out to analyze mainly empirical aspects of the activities of both groups On one hand a detailed analysis of the sources releasing radionuclides into the environment by human activities should while describing environmental pollution and its dangers contribute to its decrease in the future *Radionuclide Concentrations in Food and the Environment* Michael Poschl, Leo M.L. Nollet, 2006-08-21 As radiological residue both naturally occurring and technologically driven works its way through the ecosystem we see its negative effects on the human population *Radionuclide Concentrations in Food and the Environment* addresses the key issues concerning the relationship between natural and manmade sources of environmental radioactivity Measurement Of Weak Radioactivity Pall Theodorsson, 1996-12-11 This book is intended for scientists engaged in the measurement of weak alpha beta and gamma active samples in health physics environmental control nuclear geophysics tracer work radiocarbon dating etc It describes the underlying principles of radiation measurement and the detectors used It also covers the sources of background analyzes their effect on the detector and discusses economic ways to reduce the background The most important types of low level counting systems and the measurement of some of the more important radioisotopes are described here In cases where more than one type can be used the selection of the most suitable system is shown *Detecting Environmental Radioactivity* Manuel García-León, 2022-11-30 This textbook presents the principles and methods for the measurement of radioactivity in the environment In this regard specific low level radiation counting and spectrometry or mass spectrometry techniques are discussed including sources distribution levels and dynamics of radioactivity in nature The author gives an accurate description of the fundamental concepts and laws of radioactivity as well as the different types of detectors and mass spectrometers needed for detection Special attention is paid to scintillators semiconductor detectors and gas ionization detectors In order to explain radiochemistry some concepts about chemical separations are introduced as well The book is meant for graduate and advanced undergraduate students in physics chemistry or engineering oriented to environmental sciences and to other disciplines where monitoring of the environment and its management is of great interest Low-level

Measurements of Radioactivity in the Environment Manuel García-León,1994 **Plutonium in the Environment** A. Kudo,2001-02-23 The first volume of the new series Radioactivity in the Environment focuses on the environmental occurrence the speciation the behaviour the fate the applications and the health consequences of that much feared and much publicised element plutonium Featuring a collection of selected peer reviewed up to date papers by leading researchers in the field this work provides a state of the art description of plutonium in the environment This title helps to explain where present frontiers are drawn in our continuing efforts to understand the science of environmental plutonium and will help to place widespread concerns into perspective As a whole this new book series on environmental radioactivity addresses at academic research level the key aspects of this socially important and complex interdisciplinary subject Presented objectively and with the ultimate authority gained from the many contributions by the world s leading experts the negative and positive consequences of having a radioactive world around us will be documented and given perspective **IAEA Yearbook** ,1994

Singapore National Bibliography ,1992 **NCRP Report** ,1976 **Marine Radioactivity** ,2004-09-17 This book on Marine Radioactivity sets out to cover most of the aspects of marine radioactivity which have been the focus of scientific study in recent decades The authors and their reviews divide into topic areas which have defined the field over its history They cover the suite of natural radioisotopes which have been present in the oceans since their formation and quantitatively dominate the inventory of radioactivity in the oceans Also addressed are the suite of artificial radionuclides introduced to the oceans as a consequence of the use of the atom for development of nuclear energy nuclear weapons and various applications of nuclear science The major source of these continues to derive from the global fallout of atmospheric tests of nuclear weapons in the 1950s and 1960s but also includes both planned and accidental releases of radioactivity from both civilian and military nuclear technology The other division of the major study direction depends on whether the objective is to use the radionuclides as powerful tools to study oceanic processes to describe and understand the ocean distribution of the various natural or artificial radionuclides or to assess the different radionuclides impact on and pathways to man or marine organisms The oceans cover 70% of the Earth s surface and thus contains a corresponding large share of the Earth s radioactivity Marine Radioactivity covers topics of recent scientific study in this young field It examines both natural radioactivity radioactivity naturally present in oceans since their formation and artificial radioactivity radioactivity introduced by man and use of atomic and nuclear energy with regard to possible effects on the global environment

Health Effects of Low Radiation 2003 ,2002-10 This CD rom contains 28 papers presented to the BNES international conference on the health effects of low level radiation This conference is the fourth in the highly successful series and its aim is to present the fundamental radiobiological and dosimetric information relevant to understanding the current debate on the health effects of exposure to ionizing radiations at low doses and dose rates It is also intended to provide a forum for discussion of the latest developments in this area and their relevance to the radiological protection of human health and the

environment Environmental Impact of Marine Colliery Waste Disposal Operations on the Sea Bed Off Seaham, County Durham D. S. Limpenny, S. M. Rowlatt, P. M. Manning, 1992 **Radionuclides and Heavy Metals in Environment** Marina Marinova, Vladimir P. Perelygin, Peter Vater, 2012-12-06 This volume entitled Radionuclides and Heavy Metals in Environment contains the Proceedings of the NATO Advanced Research Workshop ARW Monitoring of Natural and Man Made Radionuclides and Heavy Metal Waste in Environment that was held at the Joint Institute for Nuclear Research JINR Dubna Russia from 3 October to 6 October 2000 Originally it was planned to held the ARW in 1999 the year when NATO was celebrating its 50th anniversary Few days before opening it had to be postponed because of problems in issuing visa for all the colleagues who intended to participate The ARW was organized and conducted by the co directors Prof Vladimir P Perelygin Joint Institute for Nuclear Research Dubna Russia and Dr Peter Vater Philipps Universitat Marburg Germany The JINR was chosen as the host institute of ARW because of the lack of contact and real co operation between the former Soviet Union FSU countries specialists in ecology and their Western well experienced colleagues The selection of this location and supplementary funds provided by Russian Foundation on Basic Research Moscow Russia and the JINR Dubna Russia made it possible to attain a rather large number of participants and observers from FSU countries The JINR provided to all the participants of the workshop an effective car minibus transportation Moscow Dubna Moscow and a rather good accommodation in Dubna **Physics Briefs** , 1992 **Radionuclides in the Environment** Clemens Walther, Dharmendra K. Gupta, 2015-10-30 This book provides extensive and comprehensive information to researchers and academicians who are interested in radionuclide contamination its sources and environmental impact It is also useful for graduate and undergraduate students specializing in radioactive waste disposal and its impact on natural as well as manmade environments A number of sites are affected by large legacies of waste from the mining and processing of radioactive minerals Over recent decades several hundred radioactive isotopes radioisotopes of natural elements have been produced artificially including ^{90}Sr ^{137}Cs and ^{131}I Several other anthropogenic radioactive elements have also been produced in large quantities for example technetium neptunium plutonium and americium although plutonium does occur naturally in trace amounts in uranium ores The deposition of radionuclides on vegetation and soil as well as the uptake from polluted aquifers root uptake or irrigation are the initial point for their transfer into the terrestrial environment and into food chains There are two principal deposition processes for the removal of pollutants from the atmosphere dry deposition is the direct transfer through absorption of gases and particles by natural surfaces such as vegetation whereas showery or wet deposition is the transport of a substance from the atmosphere to the ground by snow hail or rain Once deposited on any vegetation radionuclides are removed from plants by the airstream and rain either through percolation or by cuticular scratch The increase in biomass during plant growth does not cause a loss of activity but it does lead to a decrease in activity concentration due to effective dilution There is also systemic transport translocation of radionuclides within the plant

subsequent to foliar uptake leading the transfer of chemical components to other parts of the plant that have not been contaminated directly

Chemical Speciation in the Environment A. M. Ure, C. M. Davidson, 2008-04-15 Considerable recent research has focused on the topic of chemical speciation in the environment It is increasingly realised that the distribution mobility and biological availability of chemical elements depend not simply on their concentrations but critically on the forms in which they occur in natural systems Continuing developments in analytical chemistry have made speciation practicable even where analytes are present at trace levels as is often the case in natural samples In the second edition of this book the expertise of scientists involved in chemical speciation in various fields have been brought together to provide an overview of the current status of speciation science and indicate how the field may develop in the future *Nuclear Science Abstracts* ,1975-06

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