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Book review

J. Magill, J. Galy, Radioactivity – Radionuclides – Radiation, Springer, Berlin, Heidelberg, New York, 2005; p. 259, CD-ROM, and Fold-out of Karlsruhe Chart of the Nuclides. ISBN 3-540-21116-0

The authors are both active researchers at the Institute for Transuranium Elements in Karlsruhe. They have produced a tome that deals in turn with each of the subject titles: radioactivity, radionuclides, and radiation.

The section on radioactivity starts with a historical presentation of Man's understanding of the chemical elements, their properties, and the evolution of theories describing the atom. Included is a summary of the origins of the elements. This may seem a logical and indispensable step to introducing the nucleus and its properties. Nevertheless, many books deal either with the atom's outer electron cloud, or solely with the nucleus. This book treats both, succinctly and at a level that requires an undergraduate understanding of physics. The authors do not shy from using a bit of algebra wherever this helps understanding. For example, they provide a nice derivation of the famous expression $E = mc^2$. Nuclear energetics receive the same level of treatment, and lead to a detailed presentation of nuclear decay. They discuss the various charts of nuclides, and include a pull-out full size version of the Karlsruhe chart.

The section on radionuclides presents a broad, and relatively in-depth, description of practical applications of radionuclides. This covers archaeology and dating, applications in life sciences, as well as in industry. The authors also address transmutation research, which happens to be their forte. Throughout the section it is obvious that the authors are active researchers, and this benefits the whole book.

The section on radiation is a little shorter, and presents biological effects, packaging and transport of materials, and waste disposal. The latter topic includes an interesting discussion of natural analogues.

The appendices comprise a periodic table and a listing of properties of elements, a most useful adjunct to the chart of nuclides. A table of atomic masses rounds off this collection of data.

A CD-ROM version of the chart of nuclides accompanies the book. Clearly, the authors spent a lot of time developing this. Personally, I will not use it, but the paper version instead. The latter is user-friendlier, as it provides better access to more information at a glance. The software does, however, include a neutron reaction path

simulator that allows a visual appreciation of the competition between decay and neutron activation in the formation of elements.

All told, this is a useful book for practitioners and educators alike.

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