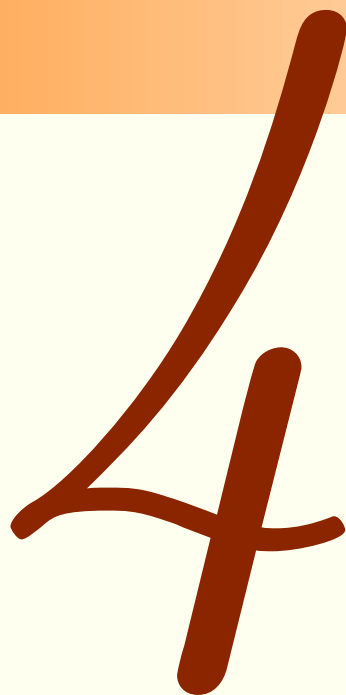


Radiochemistry

PROFESSOR
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INDUSTRIAL
RADIOCHEMISTRY
AND
NUCLEAR TECHNOLOGY



I.N.Beckman

INDUSTRIAL RADIOCHEMISTRY AND NUCLEAR TECHNOLOGY

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Abstract

“Industrial radiochemistry and nuclear technology” is the 4th volume in popular *“Radiochemistry”* text-book series. It is dedicated to the role and place of nuclear technology among great industrial developments of XX century. By taking control over process of nuclear fission, humanity gained access to unlimited power, stored inside atomic nucleus. From the very first experiments of E. Rutherford to recent progress of ITER project – nuclear science and technology has shaped the world as we know it.

Given volume introduces fundamental radiochemical principles, upon which the nuclear fuel cycle is based. The author sheds light on production of nuclear fuel for nuclear power plants as well as on manufacturing of nuclear weapons. The reader can find a detailed review of technologies, currently employed in nuclear fuel cycle and of recently developed methods for purification, separation and concentration of radionuclides. Specific features of open(once through) and closed fuel cycles, main stages in material and compound production for nuclear industry, types of radioactive waste, methods of spent nuclear fuel disposal, methods of reprocessing and long-term deposition of radioactive waste, problem of plutonium and other weapon-grade isotopes – all these and many other topics are covered in present volume. Specific focus of this volume is made on existing classes of reactors for electric power generation (particularly, on reactors using fast neutron and thermal neutron reactors), types of nuclear power plants and nuclear complexes. In conjunction with nuclear power generation, the author describes safety systems and explains both safety precautions and current sanitary regulations, used in nuclear power plants around the world.

Concluding chapters of the text-book are dedicated to new and emerging technologies of nuclear energy production which are aimed at preventing uncontrolled proliferation of nuclear weapons.

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