Radiochemistry Fundamentals

This 5-day course is designed for engineering and science employees who need a basic understanding of fundamental nuclear and radiochemistry processes, and their applications in radioactive waste management, the nuclear fuel cycle, nuclear medicine, chemical engineering, and analytical chemistry.

A COURSE VARIED FOR ALL BACKGROUNDS ...

- Gain a solid background in the fundamentals and theory of nuclear and radiochemistry.
- Learn the basics of counting statistics for radiochemistry.
- Understand the basics of instrumentation for radiochemistry counting: gamma-ray spectroscopy, alpha spectroscopy, liquid scintillation, etc.
- Understand the principles of radiochemistry in the recycling of spent nuclear fuel.

Course Topics

Atomic structure
- Atomic electron orbital arrangements
- Organization of the periodic table
- Groups and trends on the periodic table

Nuclear structure and stability
- Decay modes and types of radiation
- The chart of the nuclides

Radioactive transformation
- Equilibria
- Secular equilibrium
- Transient equilibrium
- No equilibrium

Decay Modes
- Alpha decay
- Beta decay
- Gamma transitions
- Branching decay
- Spontaneous fissions
- Rare decay modes

Measurement of nuclear radiation
- Gas-filled detectors
- Scintillation detectors
- Semiconductors
- Alpha spectrometry
- Beta spectrometry
- Gamma ray spectrometry
- Gamma ray low-level counting
- Statistics and errors in counting

Nuclear reactions
- Transmutation and the production of synthetic radioelements
- Cross-sections of nuclear reactions
- Nuclear fission
- Activation analysis

Nuclear fuel cycle
- Nuclear reactor radiochemistry
- Reprocessing of nuclear fuels
- Radioactive waste management

Dating by nuclear methods
- Cosmogenic Radionuclides
- Natural decay series
- Ratio of stable isotopes
- Radioactive disequilibira

Nuclear chemistry applied to radiochemistry
- Actinide chemistry
- Mass balances
- Chemical equations and stoichiometry
- Equilibrium reactions
- Acid/base reactions
- Oxidation/reduction reactions
- Aqueous solubility
- Phase partitioning

THE AMERICAN ACADEMY OF HEALTH PHYSICS (AAHP) HAS AWARDED THIS COURSE 32 CONTINUING EDUCATION CREDITS.

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FOR FURTHER INFORMATION OR ASSISTANCE, PLEASE CONTACT:

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