

Nuclear Process & Radio-Analytical Chemistry

Introduction

Chung-King Liu

Plan of Topics

Part I Radio-Analytical Chemistry

- 1.1 Atomic Nature of Matter
- 1.2 Modes of Radioactive Decay
- 1.3 Sources of Radioactive Nuclides
 - 1.3.1 Nuclear Fission
 - 1.3.2 Nuclear Reactors
- 1.4.3 Separation Methods for Actinides

Plan of Topics

Part II Nuclear Process Chemistry

- 2.0 Nuclear Process Chemistry Overview
- 2.1 Separation Chemistry Fundamental (I)
- 2.2 Separation Chemistry Fundamental (II)
- 2.3 Separation Chemistry Fundamental (III)
- 2.4 Separation Chemistry Fundamental (IV)
- 3.1 Bismuth Phosphate & REDOX Process
- 3.2 PUREX Process
- 3.3 Cs-Removing IX Resin
- 3.4 Glass Chemistry (Nuclear Waste Vitrification Process)

How will the course be conducted

1. Five intense days
2. 4-5 lecture sessions /day
3. Class begins at 8:30am and breaks for the day around 4:30pm
4. Each Session 50 min. /with a 10 min break
5. The lunch break will commence around noon
6. Style is open & flexible
7. Many reviewing sessions
8. Two 2-hours workshops (Examinations)

Reference Material

Texts:

Nuclear and Radiochemistry, 3rd Ed., Gerhart Friedlander, Joseph W. Kennedy, Edward S. Macias, and Julian Malcolm Miller, Wiley-Interscience, New York, N.Y., 1981.

Principles of Activation Analysis, Paul Kruger, Wiley-Interscience, New York, N.Y., 1971.

Standard Methods for the Examination of Water and Wastewater, Andrew D. Eaton, Lenore S. Clesceri, and Arnold E. Greenberg, 19th Ed., APHA, AWWA, and WEF, 1995

Radiochemical Analytical Procedures for Analysis of Environmental Samples, EMSL-LV-0539-17, 1979

Atomic and Nuclear Physics, DOE-HDBK-1019/1-93, 1993

Short Course: Introduction to Nuclear Chemistry and Fuel Cycle Separations, CRESP, December 16-18, 2008

Other Reference:

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Radio-Analytical Chemistry (Part I)

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Nuclear Process Chemistry (Part II)

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