Nuclear Chemistry—
Demonstration Summaries and Concepts

Salt with a Sparkle—Irradiated Sodium Chloride

It's hot and sizzling, and it sparkles! Ordinary table salt turns orange-brown when irradiated, due to the formation of "color centers" (defects) in the excited-state crystal structure. When the irradiated salt is heated on a hot plate, it returns to its normal colorless ground state, releasing bright flashes of light in the process. This example of thermal fluorescence mimics the process that occurs in "thermoluminescent dosimeters," sophisticated instruments that are used to monitor the amount of radiation that workers are exposed to.

Concepts
- Irradiation
- Excited state
- Crystal structure
- Fluorescence

Red Licorice Decay

Introduce the basic principles of radioactive decay and half-life with this easy and fun activity. How many half-lives are needed to reduce the amount of red licorice to undetectable and safe levels? Students measure and graph the length of red licorice remaining at definite intervals as the licorice undergoes "radioactive decay." This "cafeteria lab" also teaches students that a material does not disappear when it decays—it is converted into a new substance, food!

- Radioactivity
- Radioactive decay
- Half-life

Radioactive Decay Cards

Help students learn about nuclear decay series with this engaging card game. Students arrange a set of 15 element cards in sequence to identify the "daughter isotopes" produced during the natural radioactive decay of uranium-238 to lead-206. They then insert alpha- and beta-particle cards as needed to write nuclear decay equations for each step in the series. A great activity for teaching students about nuclear stability and radioactive decay!

- Radioactivity
- Alpha and beta particles
- Nuclear decay equations
- Nuclear decay series

Quantitative Shielding—Penetrating Ability of Beta and Gamma Radiation

Alpha, beta, and gamma radiation are quite different in terms of their composition and properties. How do these differences influence the way each type of radiation interacts with matter? What materials are best to absorb each type of radiation and "shield" workers from the potentially harmful effects of nuclear radiation? Measure the ability of beta and gamma radiation to "penetrate" different types of shielding materials and then graph the activity of the radiation versus the shielding thickness to determine the amount of material needed to reduce the radiation exposure by 50% and 95%.

- Beta and gamma radiation
- Penetrating power
- Shielding
- Geiger-Müller radiation detector

FLINN SCIENTIFIC INC. *Your Safer Source for Science Supplies*
P.O. Box 219, Batavia, IL 60510
1-800-452-1261 • Fax: (866) 452-1436
E-mail: flinn@flinnsci.com • Website: www.flinnsci.com