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Spectech

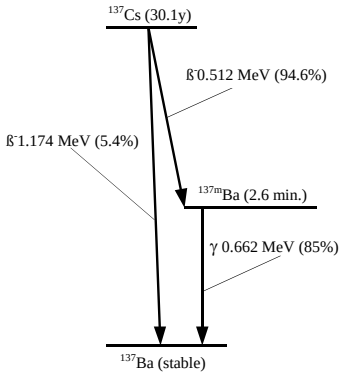
Cs/Ba-137m
Isotope Generator

Operating Instructions

Spectrum Techniques
Oak Ridge Tenn. USA

General Information

The Cs/Ba-137m Isotope Generator is designed to demonstrate the properties of radioactive decay. Based on the original Union Carbide design, it offers exceptional performance combined with ease of use and safe operation. This product is exempt from USNRC and State licensing and requires no special handling, storage or disposal requirements. A small quantity (<10µCi.) of radioactive Cs-137 is bound on a special ion exchange medium. The Cs-137 parent isotope beta decays with a 30.17y half-life to produce Ba-137m which in turn decays with a 2.55min. half-live, generating a 661.6 keV gamma ray emission. This gamma ray may be readily detected using a GM or scintillation radiation detector. An eluting solution is is used to selectively extract the Ba-137 isotope from the exchange medium leaving the parent Cs-137 isotope in place to regenerate more Ba-137. Equilibrium is re-established in less than 1 hour.



Approximately 30 minutes after elution, the residual activity of the Ba-137 solution has decayed to less than 1/1000 of its original activity making it safe for normal disposal.
When used with the eluting solution supplied, bleed through of the Cs-137 parent isotope is less 50 Bq/ml. In order to maintain correct chemical stability, it is important to use only the correct eluting solution. Additional solution may be ordered as part ELSN or prepared by the user as 0.9% NaCl in 0.04M HCl. When making solution, use distilled or DI water to avoid unwanted mineral contamination.

Caution.

If you experience a higher than normal residual count from the sample after a 20-min. decay period, discontinue using the generator and contact the manufacture. A high residual count or a brown discoloration of the elutant indicates a loss of the Cs-137 parent from the exchange medium.

Operation

Each Isotope Generator kit contains the follow items:

The isotope exchange column
A syringe for the solution
250ml bottle of eluting solution
10 steel sample planchets
Instruction booklet
Storage case

Only qualified instructors should operate the generator. Care should be exercised to avoid spills and contaminating work surfaces. If a spill does occur, the Ba-137 isotope will decay to practically zero activity within 15 min. presenting no waste disposal issue.

Under no circumstances attempt to draw solution back through the generator as this may cause rupture of the internal filters. The capsule is marked with a flow direction indicator.

- Place the planchet on the sample tray being be used.
- Draw the eluting solution into the syringe from the bottle or a or a suitable container.

- Remove the stoppers from the generator column.
- Insert the syringe firmly into the hole on the top of the generator and while holding the generator vertically, force approximately seven drops of solution through the generator onto the planchet.
- Immediately place the sample into the counter and begin counting for the predetermined counting time. After 10 minutes the sample will have decayed more than three half-lives.and may be discarded.

- After use, remove the syringe from the column, replace the stoppers and empty any unused solution back into the bottle.

Tests have shown that the generator may be milked many times in quick succession without total depletion of the Ba-137 isotope. After three milkings the sample activity will drop to about 1/5 of the initial milking but still produces a satisfactory sample for half-life measurement.
After use, the planchets may be recycled by washing and drying.