

MATERIAL SAFETY DATA SHEET

I PRODUCT IDENTIFICATION

Trade Name: Barium Carbonate
CAS #: 513-77-9

Molecular Formula: BaCO₃
NIOSH/RTECS #: CQ8750000

II HAZARDOUS INGREDIENTS

Not Applicable

III PHYSICAL DATA

Boiling Point:	N/A	Melting Point:	1300 °C (2372 °F)
Specific Gravity (H ₂ O=1):	4.28	Vapor Density (Air=1):	N/A
Vapor Pressure:	N/A	% Volatiles by Volume:	0
Evaporation Rate (Water=1):	N/A	Solubility in H ₂ O:	Negligible (< 0.1%)
Appearance and Odor:	White to cream-colored powder, no odor		

IV FIRE AND EXPLOSION HAZARDS DATA

Flash Point (Method used): N/A
Flammable Limits In Air (% By Vol.): Upper: N/D Lower: N/D
Autoignition Temperature: N/A

Special Fire Fighting Procedures: Firefighters should wear proper equipment and self-contained breathing apparatus with full facepiece operated in positive pressure mode.

Toxic Gases Produced: Carbon Monoxide, Carbon Dioxide

V HEALTH HAZARD DATA

Effects of Over Exposure:

Dust may irritate skin or eyes. Inhalation of dust may cause irritation to upper respiratory tract. Ingestion may cause nausea and vomiting. Ingestion may cause gastrointestinal pain. Chronic effects of barium compounds may include bronchial irritation. Degeneration of Central nervous system, and damage to spleen, liver, and bone marrow.

EMERGENCY AND FIRST AID PROCEDURES: Call a physician.

INGESTION: If swallowed, if conscious, give large amount of milk, milk of magnesia, or whites of eggs beaten with water. Induce vomiting.

INHALATION: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

EYES: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Flush skin with water.

VI REACTIVITY DATA

Stability: Stable

Incompatibles: Strong acids

Hazardous Polymerization: Will not occur.

Decomposition Products: Carbon Monoxide, Carbon Dioxide

Conditions to Avoid: None Documented

VII SPILL OR LEAK PROCEDURES

Steps to Be Taken in Case Material Is Released or Spilled: Wear self-contained breathing apparatus and full protective clothing. With clean shovel, carefully place material into clean, dry container and cover; remove from area. Flush spill area with water.

Disposal Procedure: Dispose in accordance with all applicable Federal, State, and Local Environmental Regulations.

EPA Hazardous Waste Number: D005 (EP Toxic Waste)

VIII SPECIAL PROTECTION INFORMATION

Respiratory Protection: None required where adequate ventilation conditions exist. If airborne concentration is high, use an appropriate respirator or dust mask.

Ventilation: Use adequate general or local exhaust ventilation to keep fume or dust levels as low as possible.

Eye/Skin Protection: Safety glasses with side shields, proper gloves are recommended.

IX SPECIAL PRECAUTIONS

Other Handling and Storage Conditions:

- Keep container tightly closed.
- Suitable for any general chemical storage area.

Saf-T-Data (TM) Storage Color Code: Orange

Transportation Data and Additional Information:

Domestic (D.O.T.):

Proper Shipping Name: Chemicals, N.O.S. (Non-Regulated)

International (IMO):

Proper Shipping Name: Barium Compounds, N.O.S. (Barium Carbonate)

Hazard Class: 6.1

UN/NA: UN1564

Labels: Harmful - Stow away from food stuffs.

Prepared by: S. Dierks

Dated: July 1993

¹⁴C	Nuclide Safety Data Sheet Carbon-14	¹⁴C
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I. PHYSICAL DATA

Radiation:	Beta (100% abundance)
Energy:	Max.: 156 keV; Average: 49 keV
Half-Life [$T_{1/2}$]:	Physical $T_{1/2}$: 5730 years [link to web decay calculator] ¹
	Biological $T_{1/2}$: 12 days
	Effective $T_{1/2}$: Bound - 12 days; unbound - 40 days
Specific Activity:	4.46 Ci/g [0.165 TBq/g] max.
Beta Range:	Air: 24 cm [10 inches]
	Water/Tissue: 0.28 mm [0.012 inches]
	[~1% of ¹⁴ C betas transmitted through dead skin layer, i.e. 0.007 cm depth]
	Plastic: 0.25 mm [0.010 inches]

II. RADIOLOGICAL DATA

Radiotoxicity ² :	6.36E-12 Sv/Bq [0.023 mrem/uCi] of ¹⁴ CO ₂ inhaled; 5.64E-10 Sv/Bq [2.09 mrem/uCi] organic compounds inhaled/ingested
Critical Organ:	Fat tissue [most labeled compounds]; bone [some labeled carbonates]
Exposure Routes:	Ingestion, inhalation, puncture, wound, skin contamination absorption
Radiological Hazard:	External Exposure - None from weak ¹⁴ C beta Internal Exposure & Contamination - Primary concern

III. SHIELDING

None required - mCi quantities not an external radiation hazard

IV. DOSIMETRY MONITORING

Urine bioassay is the most readily available method to assess intake [for ¹⁴C, no intake = no dose]
Provide a urine sample to Radiation Safety whenever your monthly ¹⁴C use exceeds 5 mCi, or after any accident/incident in which an intake is suspected

V. DETECTION & MEASUREMENT

Portable Survey Meters: Geiger-Mueller [e.g. Bicron PGM, ~10% efficiency];
Beta Scintillator [e.g. Ludlum 44-21, ~5% efficiency]

Wipe Test: Liquid Scintillation Counting is the best readily available method for counting ¹⁴C wipe tests

VI. SPECIAL PRECAUTIONS

- Avoid skin contamination [absorption], ingestion, inhalation, & injection [all routes of intake]
- Many ¹⁴C compounds readily penetrate gloves and skin; handle such compounds remotely and wear double gloves, changing the outer pair at least every 20 minutes.

¹ URL for web-based decay calculator: <http://phantom.ehs.uiuc.edu/~rad/ram/raddecay.html>

² Federal Guidance Report No. 11 [Oak Ridge, TN; Oak Ridge National Laboratory, 1988], p. 122, 156

VII. GENERAL PRECAUTIONS

1. Maintain your occupational exposure to radiation As Low As Reasonably Achievable [ALARA].
2. Ensure all persons handling radioactive material are trained, registered, & listed on an approved protocol.
3. Review the nuclide characteristics on (reverse side) prior to working with that nuclide. Review the protocol(s) authorizing the procedure to be performed and follow any additional precautions in the protocol. Contact the responsible Principal Users to view the protocol information.
4. Plan experiments to minimize external exposure by reducing exposure time, using shielding and increasing your distance from the radiation source. Reduce internal and external radiation dose by monitoring the worker and the work area after each use of radioactive material, then promptly cleaning up any contamination discovered. Use the smallest amount of radioisotope possible so as to minimize radiation dose and radioactive waste.
5. Keep an accurate inventory of radioactive material, including records of all receipts, transfers & disposal. Perform and record regular lab surveys.
6. Provide for safe disposal of radioactive waste by following institutional Waste Handling & Disposal Procedures. Avoid generating mixed waste (combinations of radioactive, biological, and chemical waste). Note lab that staff may not pour measurable quantities of radioactive material down the drain.
7. Follow the Institute policy for security of radioactive material including locking unoccupied labs where radioactive materials are stored.
8. If there is a question regarding any aspect of the radiation safety program or radioactive material use, contact Radiation Safety.

VIII. LAB PRACTICES

1. Disposable gloves, lab coats, and safety glasses are the minimum PPE [Personal Protective Equipment] required when handling radioactive material. Remove & discard potentially contaminated PPE prior to leaving the area where radioactive material is used.
2. Clearly outline radioactive material use areas with tape bearing the legend "radioactive". Cover lab bench tops where radioactive material will be handled with plastic-backed absorbent paper; change this covering periodically and whenever it's contaminated. Alternatively cover benches with thick plastic sheeting (i.e., painter's drop cloth), periodically wipe it clean and replace it if torn.
3. Label each unattended radioactive material container with the radioactive symbol, isotope, activity, and, except for waste, the ICN [inventory control number]. Place containers too small for such labels in larger labeled containers.
4. Handle radioactive solutions in trays large enough to contain the material in the event of a spill.
5. Never eat, drink, smoke, handle contact lenses, apply cosmetics, or take/apply medicine in the lab; keep food, drinks, cosmetics, etc. out of the lab entirely. Do not pipette by mouth.
6. Never store [human] food and beverage in refrigerators/freezers used for storing radioisotopes.
7. Prevent skin contact with skin-absorbable solvents containing radioactive material.
8. Fume hoods and biological safety cabinets for use with non-airborne radioactive material must be approved (through the protocol) and must be labeled "Caution Radioactive Material".
9. All volatile, gaseous, or aerosolized radioactive material must be used only in a properly operating charcoal and/or HEPA filtered fume hood or Biological Safety Cabinet bearing a Caution Airborne Radioactivity hood label, unless otherwise specified in writing by the Radiation Safety Officer. In particular, radioactive iodination must be performed only in these specially designed fume hoods. The Radiation Safety Officer (through a protocol) must approve all such use.
10. Take special precautions when working with radioactive compounds that tend to become volatile [e.g. ³⁵S labeled amino acids, ¹²⁵I - iodine tends to volatilize in acidic solutions]. These precautions may include: using the materials only within an approved fume hood, protecting the house vacuum system with primary and secondary vapor trapping devices, and covering active cell cultures with carbon-impregnating paper.
11. Use sealed containers and appropriate secondary containment to carry radioactive material between rooms Notify Radiation Safety staff before taking any radioactive material off site.