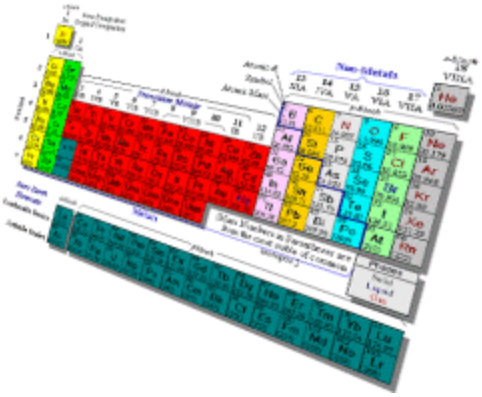
HARVARD
Campus Services
ENVIRONMENTAL HEALTH & SAFETY

Radionuclide Sink Disposal Instructions

The EH&S Radiation Protection Office (RPO) does not recommend the use of sink disposal as the primary means of radioactive waste disposal. Trace amounts and washings containing radioactive material may be disposed of only in approved sinks labeled with a "Caution Radioactive Material" sticker, and in quantities below the applicable radionuclide's daily sink disposal limit posted on the Radionuclide Sink Disposal Log. Record the date of each disposal, a reasonable estimate of the maximum activity discharged, and your initials on the Radionuclide Sink Disposal Log that is posted near the sink. Note that only materials that are readily soluble or dispersible in water and not hazardous may undergo sink disposal. Following disposal, flush the sink with water for at least 5 minutes and survey the sink to make sure there is no residual radioactive material.

Solubility Requirements



There are many approaches that may be used to determine a chemical compound's solubility in water. If the chemical form of all materials contained in the liquid waste is known, it is possible to use one of the following methods:

Solubility Class Determination

The solubility can be determined directly from most any chemistry or physics handbook. If:

- The classification of the chemical compound is "**vs**" (very soluble) or "**s**" (soluble), the chemical compound is "**readily soluble**".
- The classification of the chemical compound is "**i**" (insoluble), "**sls**" (slightly soluble), or "**vsls**" (very slightly soluble), the chemical compound is "**not readily soluble**".
- The decomposed (classified as "**d**" (decomposed)) species of these compounds are either "**vs**" or "**s**" the parent compound is "**readily soluble**". If these decomposed species are simple ions then they (class d) should be considered "**readily soluble**".

Formal Solubility Determination:

If the **formal solubility** of a compound is greater than **0.003 mole/liter**, then the compound is "**readily soluble**". Anything else is classified as "**not readily soluble**".

Formal solubility, S_f is given by:

$$S_f = \sqrt{(K_{sp} / m^m a^a)}$$

$$K_{sp} = [M]^m [A]^a$$

Where: K_{sp} is the solubility product (the equilibrium constant that describes the reaction by which a precipitate dissolves in pure water to form its constituent ions),

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[M] is the molar concentration of the metal ion (cation),
[A] is the molar concentration of the anion,
m is the number of moles of dissolved cation per mole of dissolved substance, and ***a*** is the number of moles of the dissolved anion per mole of dissolved substance.

Email **radiation_protection@harvard.edu** to send comments and suggestions to the Radiation Protection Office.