Radioisotope Safety Data Sheet
Iron 55

Half life 2.68 years

Radiations emitted

<table>
<thead>
<tr>
<th>Radiation</th>
<th>Energy, keV</th>
<th>Yield %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kα1 X-ray</td>
<td>5.9</td>
<td>16.6</td>
</tr>
<tr>
<td>Kα2 X-ray</td>
<td>5.89</td>
<td>8.4</td>
</tr>
<tr>
<td>Kβ1 X-ray</td>
<td>6.49</td>
<td>2.2</td>
</tr>
<tr>
<td>Kβ3 X-ray</td>
<td>6.49</td>
<td>1.1</td>
</tr>
<tr>
<td>Auger electrons</td>
<td>5</td>
<td>61</td>
</tr>
</tbody>
</table>

Safety precautions

55Fe is a very low energy X-ray emitter. In MBq amounts it presents only an internal hazard.

Standard laboratory PPE (gloves, lab coat, safety glasses) should be used to avoid skin contamination and ingestion.

Radiotoxicity data

55Fe is classed in group 3b according to AS 2243.4. This implies a relatively low hazard rating although all iron compounds tend to be strongly retained in the body.

The Annual Limit on Intake by ingestion (ALI_{ing}) is 61 MBq and the most restrictive inhalation limit (ALI)\_{inhal} is 22 MBq.

Shielding

No shielding is required while using MBq amounts of 55Fe.

Licensing requirements

Under the 2010 Regulation, a licence is required for the possession of 55Fe sources with concentrations of greater than 10 kBq per gram and with activities of 1 MBq or greater. A user licence is also required for any persons who use such sources for research purposes.

Disposal data

The maximum concentration of 55Fe in aqueous wastes released to a sewerage system is given in the 2010 Radiation Safety Regulation as 4.15 MBq per m² i.e. 4.15 kBq per litre.

The concentration of 55Fe in solid wastes disposed of to either the general or pathology waste streams must be less than 5 kBq per gram (5 MBq per kg) – i.e. half the concentration limit for licensing. Wastes containing 55Fe should not be placed in a decay store as there will be no significant diminution in activity and accountability for the waste may be lost. Users should consult their RSO to determine the most appropriate method of waste disposal.

Radiation detection and monitoring

The low energy X-rays from 55Fe are very difficult to detect with anything other than a beryllium window thin crystal scintillation detector. However, liquid scintillation counting of surface wipes can be used to detect removable contamination. Such wipes should be taken at the completion of labelling operations or, if 55Fe use is continuous, at least at weekly intervals.

There is no requirement for personal monitoring for 55Fe users, nor are there any personal dosemeters capable of responding to energies this low.

Laboratory requirements

Low level lab maximum activities

- Bench: 7.4 MBq
- Fume cupboard: 74 MBq

Medium level lab maximum activities

- Bench: 20 MBq
- Fume cupboard: 200 MBq

NB: While AS 2243.4 sets greater activity limits, the guidance activities are maximum amounts that should need to be used in most research projects. Should greater activities need to be used, the advice of the University Radiation Protection Adviser should be sought.

© 2013 University of Queensland OHS Division