Radioisotope Safety Data Sheet
Chromium 51

Half life 27.7 days

Radiations emitted

<table>
<thead>
<tr>
<th>Radiation</th>
<th>Energy, keV</th>
<th>Yield %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kα, X-ray</td>
<td>4.95</td>
<td>13.1</td>
</tr>
<tr>
<td>Kα2, X-ray</td>
<td>4.94</td>
<td>6.6</td>
</tr>
<tr>
<td>Kβ, X-ray</td>
<td>5.43</td>
<td>2.6</td>
</tr>
<tr>
<td>Gamma ray</td>
<td>320</td>
<td>9.9</td>
</tr>
<tr>
<td>Auger electron</td>
<td>4.4</td>
<td>67</td>
</tr>
</tbody>
</table>

Safety precautions

51Cr is a medium energy gamma emitter that presents both an internal and external hazard. Handling tools and standard laboratory PPE (gloves, lab coat, and safety glasses) should be used to minimise exposure.

Workstation shielding will not normally be required as the external radiation levels are very low and the duration of most work procedures is relatively short. However, wastes stored in the laboratory containing 51Cr may require shielding. Wastes should be monitored with a survey meter to ensure radiation levels are acceptable.

NB radiation levels in controlled areas must not exceed 40 µSv per week and in areas accessible to non-radiation workers, 10 µSv per week.

Radiotoxicity data

51Cr is classed as being of relatively low hazard (group 4) according to AS 2243.4.

The Annual Limit on Intake by ingestion (AI_ing) is 530 MBq and the most restrictive inhalation limit (AI_inhal) is 560 MBq.

Dose rates

The gamma ray dose rate constant for 51Cr is 4.7 µSv/h/GBq @ 1 m

Dose rate to the basal skin cells from contamination of 1 kBq cm⁻² 14.9 µSv h⁻¹

Dose rate from a 1 kBq (0.05 ml) droplet on skin: 0.6 µSv h⁻¹

Shielding

Half value layer (HVL) for the 320 keV gamma ray = 2 mm lead

Tenth value layer (TVL) for the 320 keV gamma ray = 7 mm lead

Licensing requirements

Under the Radiation Safety Regulation 2010 a licence is required to possess 51Cr sources with concentrations equal to or greater than 1 kBq per gram and with activities of 10 MBq or greater.

In the University, possession licences are held by schools and centres rather than individuals. However, individual user licences are required for persons who use licenceable sources for research purposes.

Disposal data

The maximum concentration of 51Cr in aqueous wastes released to a sewerage system is given in the Radiation Safety Regulation 2010 as 36 MBq per m³ i.e. 36 kBq per litre.

The concentration of 51Cr 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.

Radiation detection and monitoring

A large diameter end window or pancake type GM tube contamination monitor is the most suitable type of meter for contamination control. TLD dosimeters are recommended for whole body personal monitoring. (For details see the Personal Radiation Monitoring Safety Guideline).

Laboratory requirements

Low level lab maximum activities

Bench: 37 MBq
Fume cupboard: 370 MBq

Medium level lab maximum activities

Bench: 100 MBq
Fume cupboard: 1 GBq

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