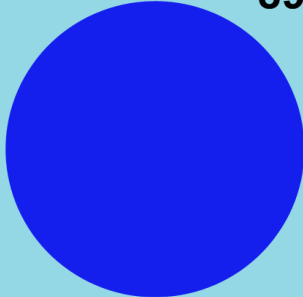


1


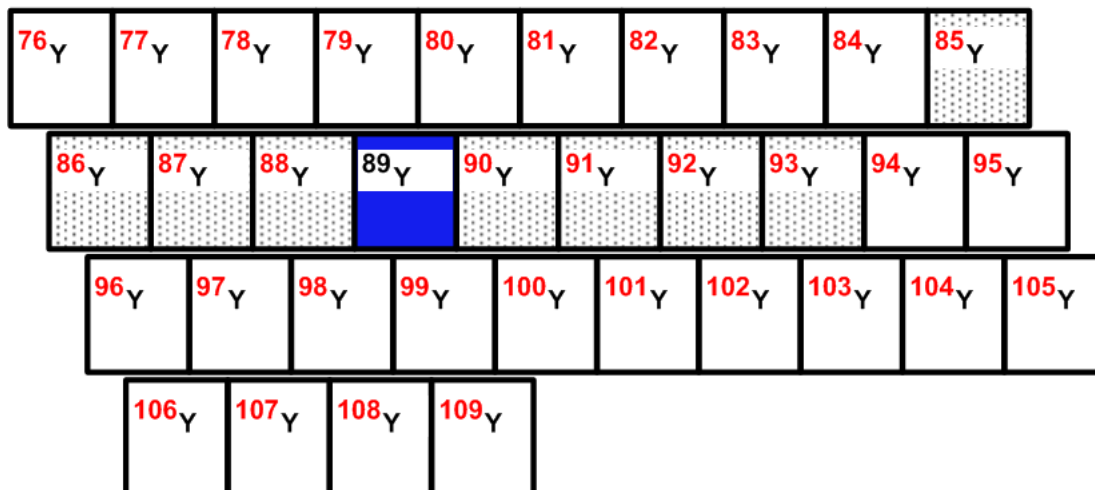

2 **4.39 yttrium**

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yttrium Y 39 88.905 84(1)	89 
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Stable isotope	Relative atomic mass	Mole fraction
^{89}Y	88.905 84	1

Half-life of radioactive isotope

Less than 1 hour Between 1 hour and 1 year 

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22 **4.39.1 Yttrium isotopes in medicine**

23

24 Carbon nanotubes (CNT), which are nano-scaled carbon tubes, are being examined in
 25 nanobiotechnology research studies because it has been discovered that CNTs labeled with ^{86}Y
 26 (with a **half-life** of 0.6 day) are soluble when they are injected into mice. This discovery was
 27 made after mice were given an **intravenous** or intraperitoneal (directly into a body cavity)
 28 injection with the ^{86}Y CNT and then were examined using **positron emission tomography**

IUPAC

1 (PET) scans to observe whether the ^{86}Y had been flushed from their systems. The PET scan
2 determined that accumulation of ^{86}Y occurred in the liver, kidney, and spleen with very rapid
3 blood clearance. This has broad implications for developing drug treatments [300].
4 Radiomicrosphere therapy (RT) that uses ^{90}Y (with a half-life of 64 hours) microspheres is a
5 proven therapy that helps treat hepatic (liver) cancer (Figure 4.39.1) [301]. ^{90}Y is also used in
6 **radiosynovectomy** to reduce joint pain [302].

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Fig. 4.39.1: Ultrapure ^{90}Y . (Photo Source: Pacific Northwest National Laboratory) [303].