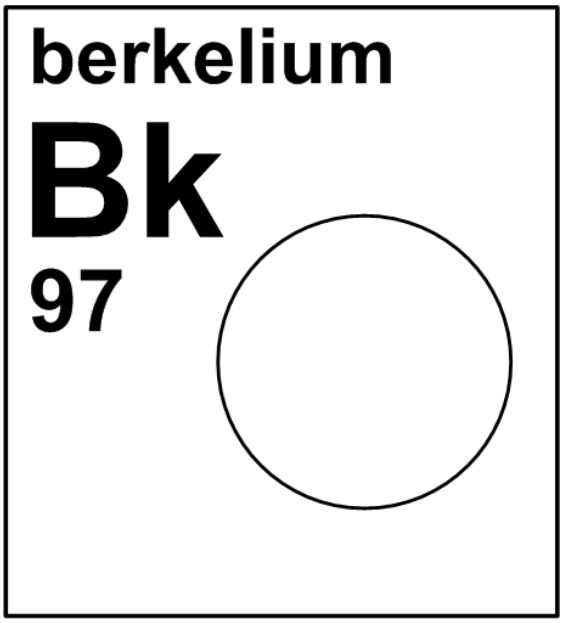
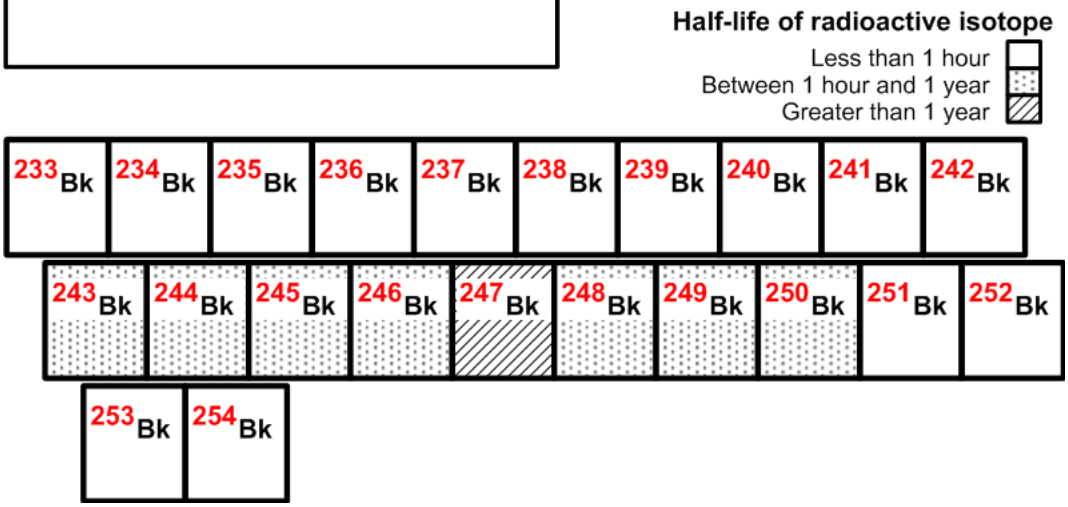
4.97 berkelium



Stable isotope	Relative atomic mass	Mole fraction
(none)		



Berkelium does not occur naturally in the Earth's crust. It was first synthesized in December 1949 by Stanley G. Thompson, Glenn T. Seaborg, and Albert Ghiorso at the University of California in Berkeley using the nuclear reaction ^{241}Am (^{4}He, 2n) ^{243}Bk in the Berkeley 60-inch **cyclotron**. The **element** was named for the town in California where it was first synthesized. The first **isotope** of berkelium produced from this experiment had a **mass number** of 243 and a half-life of 4.5 hr. ^{247}Bk has a **half-life** of 1.4×10^{3} years, which makes it one of the least **radioactive isotopes** of berkelium. ^{249}Bk has a half-life of 320 days, which makes it possible and easier to isolate and study on a macroscopic scale, although studies have found that the radiation given off from berkelium creates health hazards. For example, lengthy exposure to the radiation from berkelium has been shown to cause accumulation of berkelium in the skeletal system of rats. The radiation is also unfavorable to the formation of red blood cells [617-621]. Berkelium has no

known isotopic applications aside from scientific research in which it served as a target for the production of tennessine (Figure 4.97.1).

Fig. 4.97.1: The green fluid in the tip of the vial is ^{249}Bk, which was a critical isotope in the synthesis of tennessine (Ts). To make sure that that ^{249}Bk was in its purest form, it was synthesized in the High Flux Isotope Reactor at DOE's Oak Ridge National Laboratory and then used as the target in the Joint Institute of Nuclear Research (JINR) U-400 **cyclotron** accelerator and flooded with ^{48}Ca ions to synthesize Ts. (Photo Source: U.S. DOE Office of Science (SC), Oak Ridge National Laboratory) [617].