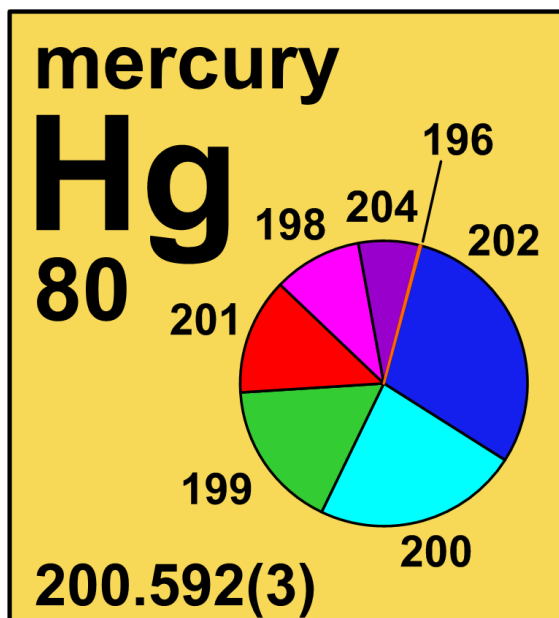


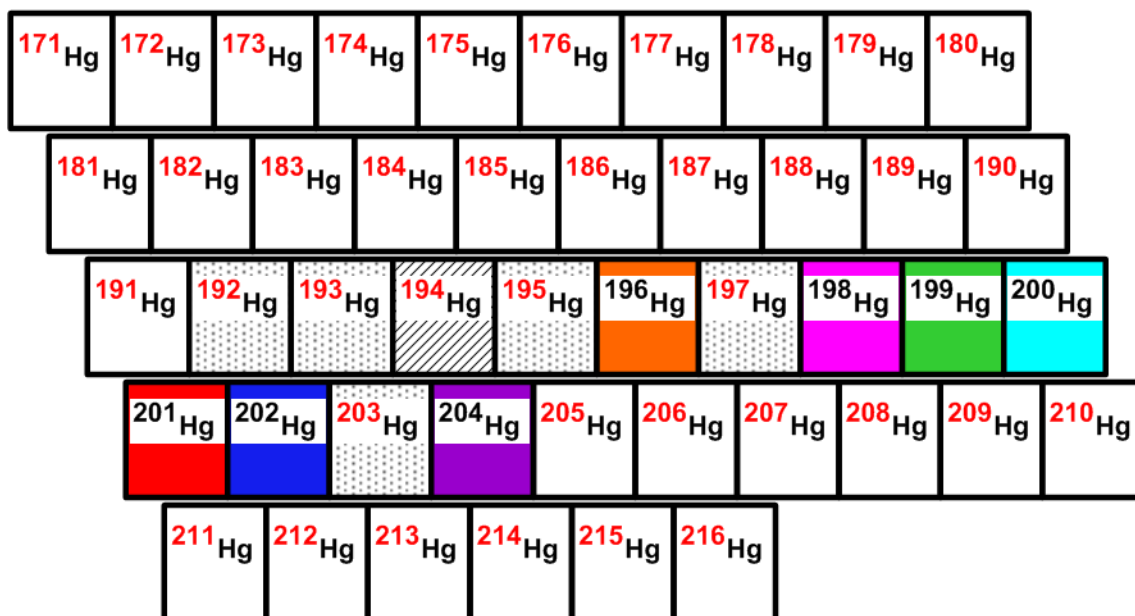
4.80 mercury



Stable isotope	Relative atomic mass	Mole fraction
^{196}Hg	195.965 83	0.0015
^{198}Hg	197.966 769	0.1004
^{199}Hg	198.968 281	0.1694
^{200}Hg	199.968 327	0.2314
^{201}Hg	200.970 303	0.1317
^{202}Hg	201.970 643	0.2974
^{204}Hg	203.973 494	0.0682

Half-life of radioactive isotope

Less than 1 hour	
Between 1 hour and 1 year	
Greater than 1 year	



4.80.1 Mercury isotopes in Earth/planetary science

^{198}Hg , ^{200}Hg , and ^{202}Hg are **stable isotopes** of mercury that can be used to study environmental sources and environmental sinks of this **element** in aquatic and terrestrial ecosystems. For example, in an ecosystem, different stable isotopes of mercury can be added to an upland region

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for run-off evaluation, to a lake for direct deposition analysis, and to a wetland region for outflow contribution analysis (Figure 4.80.1). As a result, it is possible to determine the entry points of mercury into an ecosystem and determine how the inputs of mercury affect the accumulation of this element in local fish populations. An international consortium of scientists is conducting an experiment called METAALICUS (Mercury Experiment To Assess Atmospheric Loading In Canada and the U.S.). This experiment includes determination of whether mercury contamination in fish is old or new mercury. **Tracer** studies were performed in northwestern Ontario at the Experimental Lakes Area of the Department of Fisheries and Oceans Canada [534].



Fig. 4.80.1: ^{202}Hg was added to small watersheds to study the fate of mercury from atmospheric deposition in pristine (in its original condition) lakes as part of the METAALICUS study. (Photo Source: Toxic Substances Hydrology Program, U.S. Geological Survey) [534].

4.80.2 Mercury isotopes used as a source of radioactive isotope(s)

^{202}Hg is used to produce radioactive ^{203}Hg (with a **half-life** of 46.6 days) via the $^{202}\text{Hg} (n, \gamma)$ ^{203}Hg reaction, which is used in **gamma radiation** calibration and medical tests.