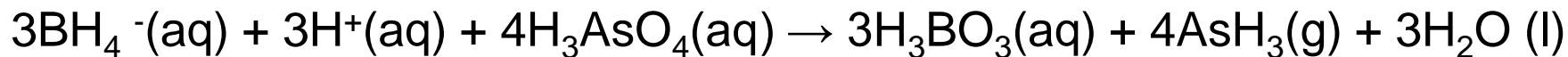
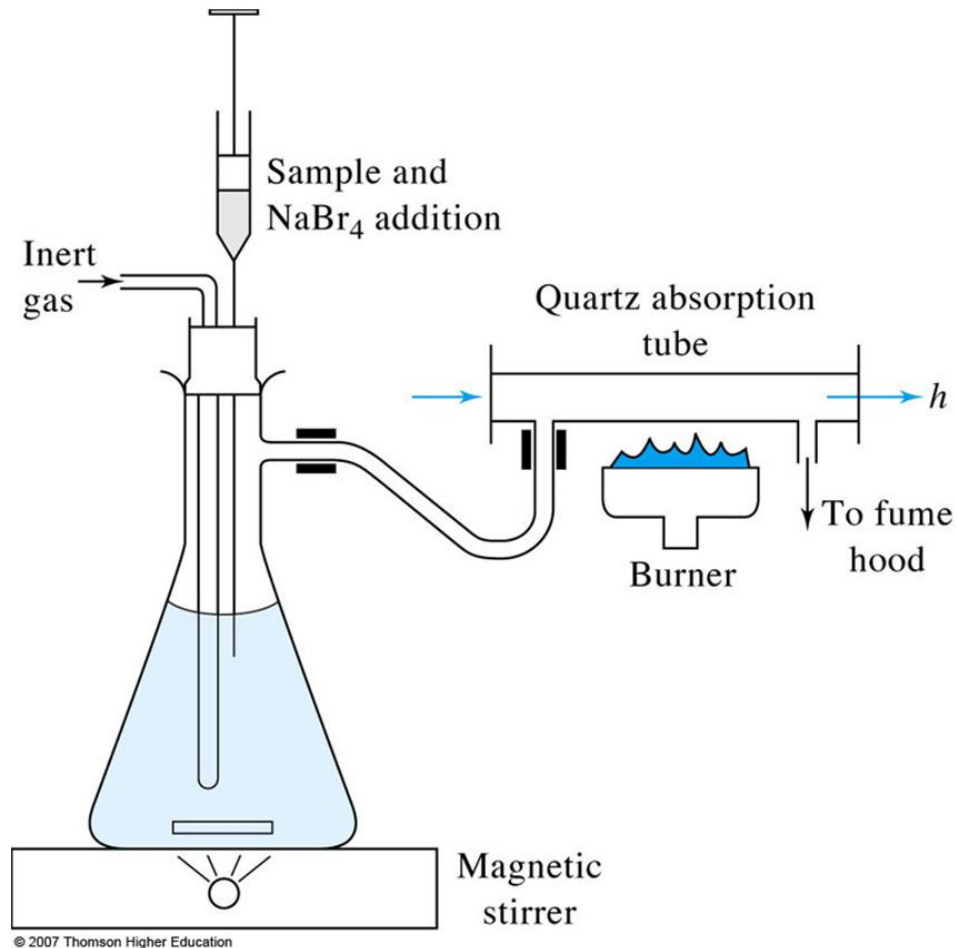


Hydride Atomization:

- *The technique provides a means of introducing samples containing As, Sb, Sn, Se, Bi, and Pb into an atomizer in the gas phase.
- * With these elements, hydride atomization enhances detection limits by a factor of 10 to 100 compared to alternative methods.
- *Hydride generation occurs by adding an acidified aqueous solution of the sample to a 1% aqueous solution of sodium borohydride, all of which is contained in a glass vessel.



- *The volatile hydride generated by the reaction that occurs is swept into the atomization chamber by an inert gas, where it undergoes decomposition.
- * The chamber is usually a silica tube heated to several hundred degrees in a furnace or in a flame where atomization takes place.

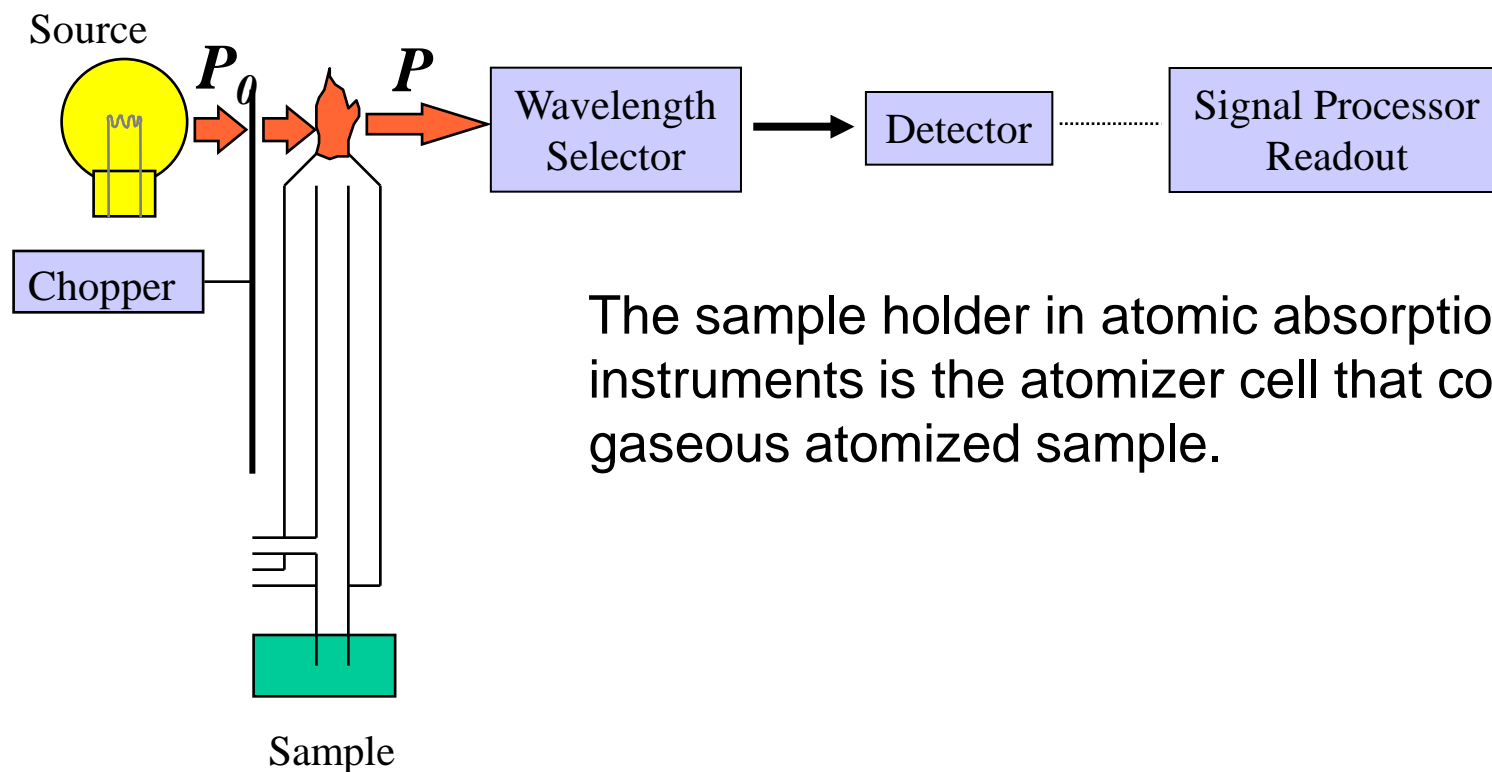
Cold-Vapor Atomization:

- The cold-vapor technique is an atomization method applicable only to the determination of mercury because it is the only metallic element that has an appreciable vapor pressure at ambient temperature.
- mercury is converted to Hg^{+2} by treatment of samples with an oxidizing mixture of nitric and sulfuric acids followed by reduction of the Hg to the metal Hg^0 with SnCl_2 .
- The elemental mercury is then swept into a long-pass absorption tube similar to the one shown in Figure 9-9 by bubbling a stream of inert gas through the reaction mixture.
- The determination is completed by measuring the absorbance at 253.7 nm. Detection limits in the parts-per-billion range are achieved.
- Several manufacturers offer automatic instruments for performing this determination.

ATOMIC ABSORPTION INSTRUMENTATION

Instruments for atomic absorption spectrometry (AAS) consist of:

- (1) Radiation source
- (2) Sample holder = atomizer
- (3) Wavelength selector
- (4) Detector
- (5) Signal processor and readout



The sample holder in atomic absorption instruments is the atomizer cell that contains the gaseous atomized sample.

1. Radiation Sources:

-It is necessary that band width of the radiation source must be narrow relative to the width of an absorption line or band.

-Fig. 9-10a shows the emission spectrum of a typical atomic lamp source. With a suitable filter or monochromator, all but one of these lines are removed. Fig. 9-10b shows the absorption spectrum for the analyte between wavelengths λ_1 and λ_2 . As shown in Figure 9-10c, passage of the line from the source through the flame reduces its intensity from P_0 to P ; the absorbance is then given by $\log(P_0/P)$, which is linearly related to the concentration of the analyte in the sample.

- The problem created by limited width of atomic absorption peaks has been solved by the use of line sources with bandwidths even narrower than absorption peaks. A disadvantage of the procedure is that separate lamp source is needed for each element.

