

MOLE LAB (Part II)  
Data & Observations

ACCEPTED VALUES FOR ATOMIC RADIUS

- Aluminum  $1.25 \times 10^{-8}$  cm
- Zinc  $1.25 \times 10^{-8}$  cm
- Iron  $1.16 \times 10^{-8}$  cm
- Copper  $1.17 \times 10^{-8}$  cm

Calculate the percent error between your findings, which is known as the experimental value, and the accepted (actual) value. Use the formula below to calculate percent difference. Record these findings in the table.

$$\%error = \left( \frac{Actual - Experimental}{Actual} \right) \times 100\%$$

Calculations:

Al  $\left( \frac{1.25 \times 10^{-8} \text{ cm} - 1.23 \times 10^{-8} \text{ cm}}{1.25 \times 10^{-8} \text{ cm}} \right) = \frac{2 \times 10^{-10} \text{ cm}}{1.25 \times 10^{-8} \text{ cm}} = 0.016\%$

Fe  $\left( \frac{1.16 \times 10^{-8} \text{ cm} - 1.096 \times 10^{-8} \text{ cm}}{1.16 \times 10^{-8} \text{ cm}} \right) = \frac{6 \times 10^{-10}}{1.16 \times 10^{-8}} = 0.052\%$

Cu  $\left( \frac{1.17 \times 10^{-8} \text{ cm} - 1.09 \times 10^{-8} \text{ cm}}{1.17 \times 10^{-8} \text{ cm}} \right) = \frac{8 \times 10^{-9}}{1.17 \times 10^{-8}} = 0.068\%$

Zn  $\left( \frac{1.25 \times 10^{-8} \text{ cm} - 1.12 \times 10^{-8} \text{ cm}}{1.25 \times 10^{-8} \text{ cm}} \right) = \frac{1.3 \times 10^{-9}}{1.25 \times 10^{-8}} = 0.116\%$

	Element		Actual Value	Experimental Value
A	Aluminum	(Al)	$1.25 \times 10^{-8} \text{ cm}$	$1.23 \times 10^{-8} \text{ cm}$
B	Iron	(Fe)	$1.16 \times 10^{-8} \text{ cm}$	$1.10 \times 10^{-8} \text{ cm}$
C	Copper	(Cu)	$1.17 \times 10^{-8} \text{ cm}$	$1.087 \times 10^{-8} \text{ cm}$
D	Zinc	(Zn)	$1.25 \times 10^{-8} \text{ cm}$	$1.12 \times 10^{-8} \text{ cm}$
	Percent Error			
A	0.016%			
B	0.052%			
C	0.068%			
D	0.116%			

Josiah Dudley

MOLE LAB (Part II)  
Data & Observations

Specimen	Mass of 1 mole	Atomic Mass	Description	Element's Identity	Molar Mass/(6.02 x 10 <sup>23</sup> atoms) Mass of 1 Atom	(lwh)/(6.02 x 10 <sup>23</sup> atoms) Atomic Volume
A	65.66g	66g	Dull Heavy Speckled Dull silver	Zn Zinc	1.099 x 10 <sup>-23</sup> g	1.11 x 10 <sup>-23</sup> cm <sup>3</sup> /atom
B	27.2g	27g	light shiny silver	Al Aluminum	4.158 x 10 <sup>-23</sup>	1.483 x 10 <sup>-23</sup> cm <sup>3</sup> /atom
C	55.81g	56	Heavy Dull Peutecolor	Fe Iron	9.271 x 10 <sup>-23</sup>	1.052 x 10 <sup>-23</sup> cm <sup>3</sup> /atom
D	63.42g	64	Shiny Heavy Speckled	Cu Copper	1.053 x 10 <sup>-23</sup>	1.029 x 10 <sup>-23</sup> cm <sup>3</sup> /atom

	Diameter/2 Atomic radius	Volume Atomic Diameter
A	1.12 x 10 <sup>-8</sup> cm	2.23 x 10 <sup>-8</sup> cm
B	1.23 x 10 <sup>-8</sup> cm	2.457 x 10 <sup>-8</sup> cm
C	1.096 x 10 <sup>-8</sup> cm	2.191 x 10 <sup>-8</sup> cm
D	1.087 x 10 <sup>-8</sup> cm	2.174 x 10 <sup>-8</sup> cm