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Measurements II: Density of a Solid

3 Lab Report

Jaqueline Martinez
Name

1:00pm
Time

M T (W) R F

Density of Unknown Metal

Temperature of water: 29 °C

Density of water: 0.9960 g/cm³

	Trial 1	Trial 2	Trial 3	Trial 4	
Mass of empty flask + stopper	29.491 g	29.489 g	29.488 g	29.489 g	
Mass of stoppered flask + water (to fill the flask)	61.298 g	61.293 g	61.281 g	61.281 g	
Mass of water (to fill the flask)	31.807 g	31.794 g	31.793 g	31.792 g	
Internal volume of flask (see Appendix H)	31.935 cm³	31.922 cm³	31.921 cm³	31.920 cm³	→ mass ÷ density
Mass of metal	20.949 g	20.949 g	20.949 g	20.949 g	
Mass of stoppered flask + metal + water	77.610 g	77.604 g	77.599 g	77.600 g	
Mass of water (surrounding the metal)	27.170 g	27.166 g	27.162 g	27.162 g	→ total mass - metal mass = mass of flask
Volume of water (surrounding the metal)	27.279 cm³	27.275 cm³	27.271 cm³	27.271 cm³	→ mass ÷ density
Volume of metal	4.656 cm³	4.647 cm³	4.65 cm³	4.649 cm³	→ volume of flask − volume of water

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DENSITY OF METAL	4.499 g/cm³	4.508 g/cm³	4.50 g/cm³	4.506 g/cm³

4.505

→ mass / volume

	Trial 1	Trial 2	Trial 3	Trial 4
AVERAGE DENSITY OF METAL	4.504 g/cm³			
STANDARD DEVIATION	0.003 g/cm³			
Sample number	6			
Proposed identity of metal (chemical symbol and name)	Titanium			

Show your calculations below.

$$\sqrt{\frac{(D_1-\bar{D})^2+(D_2-\bar{D})^2+(D_3-\bar{D})^2}{3}}$$

average density
↳ trial 1 + 2 + 4 / 3

$$\sqrt{\frac{(4.499-4.504)^2+(4.508-4.504)^2+(4.506-4.504)^2}{3}}$$

mean
↳ 4.504

0.000025 + 0.000016 + 0.000004

$\sqrt{0.00001125}$
↳ 0.003354

Metal density: 4.504
error → 0.003

9.008

4.504 ← deviation of 0.003
↳ Titanium → 4.506