

Synthesis and Analysis of Ammonium Decavanadate, $(\text{NH}_4)_6\text{V}_{10}\text{O}_{28}\cdot 6\text{H}_2\text{O}$

Data

Synthesis of $(\text{NH}_4)_6\text{V}_{10}\text{O}_{28}\cdot 6\text{H}_2\text{O}$

Mass of NH_4VO_3 _____

Moles of NH_4VO_3 _____

Mass of $(\text{NH}_4)_6\text{V}_{10}\text{O}_{28}\cdot 6\text{H}_2\text{O}$ _____

Theoretical Yield _____

Percent Yield _____

UV-Vis Analysis of $(\text{NH}_4)_6\text{V}_{10}\text{O}_{28}\cdot 6\text{H}_2\text{O}$

Solution (Decavanadate: H_2O)	Concentration (M)	Absorbance
1:4		
2:3		
3:2		
4:1		
5:0		
<i>My solution B</i>		

Append a Beer's Law plot of your results with a best-fit line with equation and goodness of fit, and 'my solution B' data point clearly labeled.

Grams of $(\text{NH}_4)_6\text{V}_{10}\text{O}_{28}\cdot 6\text{H}_2\text{O}$ used to make first solution _____

Concentration of vanadium in *my solution B* _____

Moles of vanadium in *my solution B* _____

Moles of vanadium in solution A _____

Grams vanadium in solution A _____

Experimental percent vanadium in $(\text{NH}_4)_6\text{V}_{10}\text{O}_{28}\cdot 6\text{H}_2\text{O}$ _____

Theoretical percent vanadium in $(\text{NH}_4)_6\text{V}_{10}\text{O}_{28}\cdot 6\text{H}_2\text{O}$ _____

Percent error _____

Permanganate Titration of $(\text{NH}_4)_6\text{V}_{10}\text{O}_{28}\cdot 6\text{H}_2\text{O}$

Mass of oxalic acid dihydrate ($\text{H}_2\text{C}_2\text{O}_4\cdot 2\text{H}_2\text{O}$) _____

Moles of oxalic acid dihydrate _____

Molarity of standard oxalic acid solution _____

	Titration #1	Titration #2	Titration #3
Vol. std. oxalic acid			
Moles oxalic acid			
Moles permanganate			
KMnO ₄ : initial mL			
KMnO ₄ : final mL			
Vol. permanganate			
KMnO ₄ Molarity			

Average KMnO₄ Molarity _____

	Titration #1	Titration #2	Titration #3
Vol. vanadium sol'n			
KMnO ₄ : initial mL			
KMnO ₄ : final mL			
Vol. permanganate			
Moles permanganate			
Moles vanadium			

Average moles vanadium _____

Moles vanadium in whole (100. mL) titration solution _____

Mass vanadium in titration solution _____

Mass of $(\text{NH}_4)_6\text{V}_{10}\text{O}_{28}\cdot 6\text{H}_2\text{O}$ used to make titration solution _____

Experimental percent vanadium in $(\text{NH}_4)_6\text{V}_{10}\text{O}_{28}\cdot 6\text{H}_2\text{O}$ _____

Theoretical percent vanadium in $(\text{NH}_4)_6\text{V}_{10}\text{O}_{28}\cdot 6\text{H}_2\text{O}$ _____

Percent error _____

Append calculations for all work presented here.

IR Analysis

Report observed bands to the nearest whole wavenumber (cm^{-1}). Refer to standard IR spectra of ammonium metavanadate and acetic acid provided, and your IR spectrum of your product, $(\text{NH}_4)_6\text{V}_{10}\text{O}_{28}\cdot 6\text{H}_2\text{O}$.

Legend: ν = stretch, δ = bend

Assignment	cm^{-1} in NH_4VO_3	cm^{-1} in $\text{CH}_3\text{CO}_2\text{H}$	cm^{-1} in $(\text{NH}_4)_6\text{V}_{10}\text{O}_{28}\cdot 6\text{H}_2\text{O}$
$\nu\text{O-H}$			
$\nu\text{N-H}$			
$\nu\text{N-H}$			
$\nu\text{N-H}$			
$\nu\text{C-H}$			
$\nu\text{C=O}$			
$\delta\text{C-H}$			
$\delta\text{N-H}$			
$\nu\text{C-O}$			
$\nu\text{V-O}$			
$\nu\text{V-O}$			
$\nu\text{V-O}$			

Thought Questions

1. Describe color changes observed during this laboratory experiment. State the chemical identities of the various colored components.

