

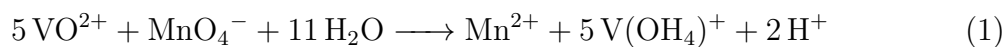
Chapter 4 — Problems 50, 56

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50. The Vanadium (V) ion in a .5000[g] sample of ore is converted to VO_2^+ ions. The amount of VO_2^+ in solution can be determined by reaction with an acid solution of KMnO_4 . The balanced equation for the reaction is (1). What is the mass percent of vanadium in the ore if 26.45[mL] of .02250[M] permanganate solution is required to complete the reaction? (2)



$$\begin{aligned} 26.45[\text{mL}] &\rightarrow .02645[\text{L}] \\ .0225 \cdot .02645 &= .000595[\text{mol}_{\text{MnO}_4^-}] \rightarrow .002975[\text{mol}_{\text{VO}^{2+}}] \\ .002975 \cdot 51 &= .1517[\text{g}_\text{V}] \\ \%_V &= \frac{.1517}{.5} \cdot 100\% = 30.3\% \end{aligned} \quad (2)$$