

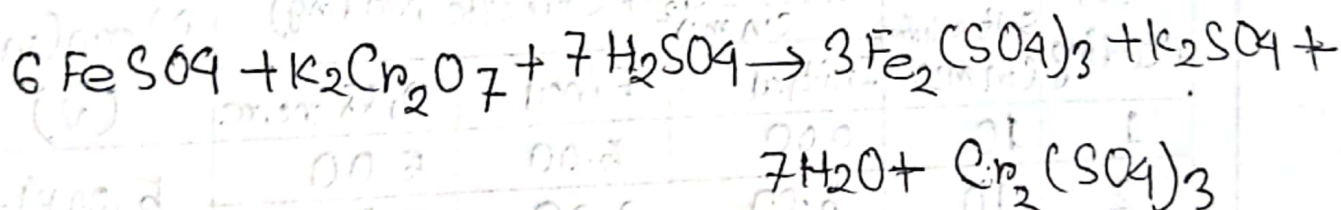
EXP6: Determination of Ferrous ion ( $\text{Fe}^{2+}$ ) in a supplied solution of Iron salt, by standard Potassium Dichromate ( $\text{K}_2\text{Cr}_2\text{O}_7$ ) solution.

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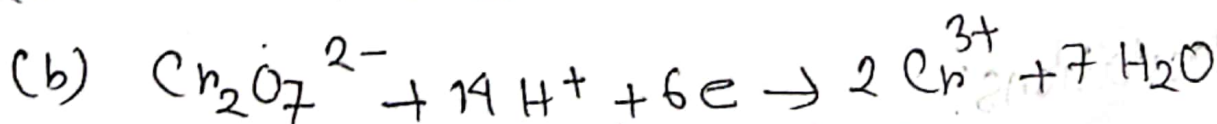
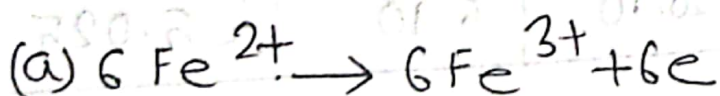
Theory:

Method: Oxidation-reduction titration

Reaction:



Redox Half Reactions:



Indicator:

Diphenyl amine  $(\text{C}_6\text{H}_5)_2\text{NH}$

## Experimental Data:

The strength of  $K_2Cr_2O_7$  solution =  $\frac{\text{Weight taken (in gm)} \times 0.1}{0.49} (N)$

$$= \frac{0.65 \times 0.1}{0.49} N$$

$$= 0.13 N$$

Table: Determination of the amount of iron in Mohr's salt solution using standard  $K_2Cr_2O_7$  solution.

No. Of reading	Vol of Mohr's salt solution (in mL)	Vol of $K_2Cr_2O_7$ (burette reading) (in mL)			Mean (in mL) (V)
		Initial	Final	Difference	
1	10	0.00	5.00	5.00	$\frac{5.00 + 4.90 + 5.10 + 5.10}{4}$ $= 5.025$
2	10	5.00	9.90	4.90	
3	10	9.90	15.00	5.10	
4	10	15.00	20.10	5.10	

Calculations:  $1 \text{ ml } 1 N K_2Cr_2O_7 \equiv 0.05589 \text{ gm of } Fe^{2+}$

Amount of iron in 10 mL of iron salt solution =

$$= 0.05589 \times V \times S \text{ gm}$$

$$= 0.05589 \times 5.025 \times 0.13 \text{ gm}$$

$$= 0.036 \text{ gm}$$

Amount of iron in 500 ml of iron

$$\text{salt solution} = 0.05584 \times V \times S \times 50 \text{ gm}$$

$$= 0.05584 \times 5.025 \times 0.73 \times 50 \text{ gm}$$

$$= 1.824 \text{ gm}$$

Observe value of  $\text{Fe}^{2+}$  (in 500 ml solution) = 1.824 gm

$$\text{known value of } \text{Fe}^{2+} \text{ (in 500 ml solution)} = \frac{55.84 \times 8.90}{392.14} \text{ gm}$$

$$= 1.267 \text{ gm}$$

Results:

The amount of ferrous ions in 500 ml of iron salt solution is 1.824 gm.

$$\text{Percentage of error: } \frac{\text{known value} - \text{observed value}}{\text{known value}} \times 100$$

$$= \frac{1.267 - 1.824}{1.267} \times 100$$

$$= -0.4396 \times 100$$

$$= -43.96\%$$