

Equilibrium of $\text{CrO}_4^{2-}/\text{Cr}_2\text{O}_7^{2-}$

Recommended for Chapter(s): 6

Demo #021

Materials NOT in box

1. Safety goggles.

Procedure

1. Pour 50 mL of 1 M K_2CrO_4 into a 250 mL Erlenmeyer flask. The solution will be yellow in color.
 - a. Note: You can also use the used solution that is in the bottle labeled used K_2CrO_4
2. Add ~8 mL of 3 M H_2SO_4 . The solution should turn orange.
3. Add ~8 mL of 6 M NaOH . The solution should turn yellow.
4. Repeat the step 2 and 3 if desired.

Safety

1. Wear safety goggles.

Clean Up

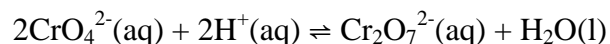
1. Put the used solution into the used K_2CrO_4 bottle.
2. Return the materials to the cart in the demonstration library room.

Stockroom Notes

1. Make sure that used K_2CrO_4 is bottle is no more than $\frac{1}{2}$ way full. If the bottle is over $\frac{1}{2}$ way full, pour off the excess solution into inorganic waste located in the hood of the chemistry stockroom.
2. Replace glassware with clean glassware.
3. If needed refill any materials that have been used up.
4. Return items to demonstration tub.
5. Return tub to the demonstration library.
 - a. Return the goggles to the goggle box.

Discussion

For this demonstration the following equilibrium is manipulated.



Solutions containing primarily the CrO_4^{2-} ion are yellow in color, while solutions containing primarily the $\text{Cr}_2\text{O}_7^{2-}$ ions are orange in color. This demonstration can be used

to demonstrate Le Chatelier's Principle. Originally the solution is yellow (more CrO_4^{2-}) as H^+ ions are added to the solution the equilibrium shifts to the products, resulting in the solution turning orange (more $\text{Cr}_2\text{O}_7^{2-}$). When NaOH is added to the solution it neutralizes the acid, removing H^+ ions, which in turn shifts the equilibrium to the reactants and the solutions turns yellow (more CrO_4^{2-}) again.

Materials for demo 021

1. 1 M K_2CrO_4
2. 3 M H_2SO_4 with pipette
3. 6 M NaOH with pipette
4. 250 mL Erlenmeyer Flask
5. Used K_2CrO_4 bottle