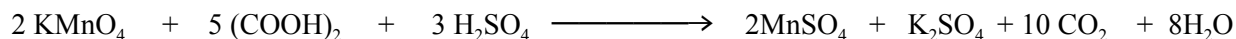


Lab: Oxalate-Permanganate Clock



Procedure:

- You will prepare mixtures in test tubes according to the following table. You will note that the volume in every tube is 16 cm³. The sulphuric acid solution is **very** strong! **Be careful!** Use a stopper when mixing the tubes. Rinse it thoroughly after each use to avoid contamination. Hot water from the tap will provide the high temperature bath needed for tube #7; an ice bath at the front of the class will serve for tube #8. You may be asked to do another temperature, as assigned by the teacher. Just follow the procedures for tube #7 or 8.
- Once each tube is mixed, add 2.0 cm³ of 0.002 mol dm⁻³ potassium permanganate solution to the tube, noting the time at which the addition was made. Stopper the tube and invert it three times to mix it thoroughly, (must stir constantly).
- At the bottom of the table below, record the time required for the **purple** color of the permanganate to completely disappear. Another color may form. This is not important; it's the disappearance of purple that matters.

Substance	Tube #1	Tube #2	Tube #3	Tube #4	Tube #5	Tube #6	Tube #7	Tube #8
oxalic acid 0.10 mol dm ⁻³	4mL	8mL	2mL	4mL	4mL	4mL	4mL	4mL
sulphuric acid (3.60 mol dm ⁻³)	8mL	8mL	8mL	4mL	8mL	8mL	8mL	8mL
water	4mL	0	6mL	8mL	4mL	4mL	4mL	4mL
manganese (II) sulphate crystal	0	0	0	0	one	0	0	0
potassium sulphate crystal	0	0	0	0	0	one	0	0
temperature	room	room	room	room	room	room	50 °C	5 °C
My reaction time(s)								
Class Average(s)								

- Suppose a second 2.0 cm³ portion of potassium permanganate solution had been added to Tube #1 after the reaction. What do you expect would happen? (Justify your hypothesis.) Test your prediction experimentally. Explain the result.
- Summarize the data collected from this series of reactions. Explain the various effects that were observed.
- Sketch a graph of reaction time versus temperature for the data from tubes #1,7,8 and the one assigned by the teacher. Explain from a molecular point of view why the graph appears the way it does.