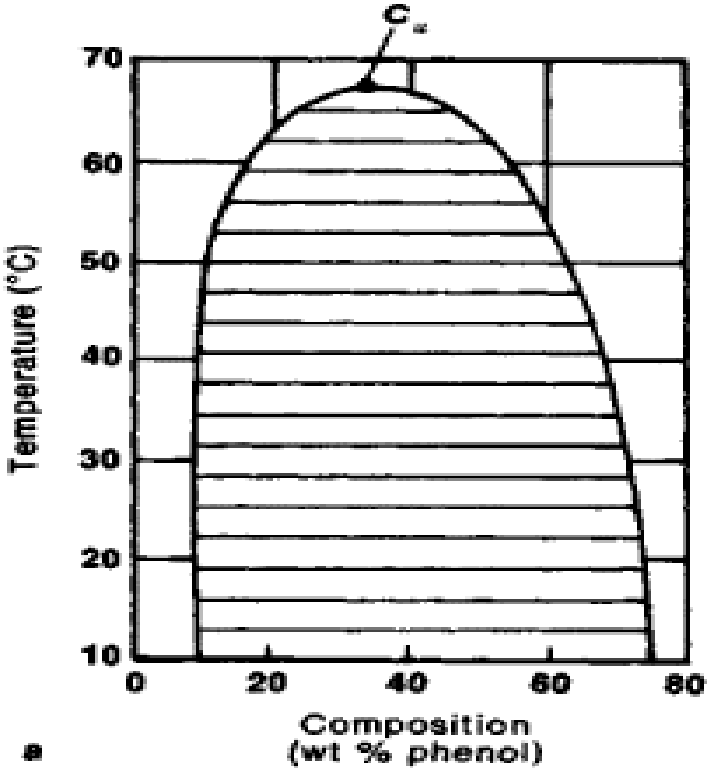
Experiment: 1

Aim: To determine the Critical Solution Temperature (CST) or upper consolute point of phenol-water system.

Principle: Two partially miscible liquids may become completely miscible at a higher temperature since solubility increases with temperature generally. This miscibility temperature is different for different compositions of the mixture. The highest miscibility temperature is called the critical solution temperature or CST. Above this temperature, *all compositions* of this mixture are completely miscible.

Procedure: Take a clean hard glass test tube and a thermometer (range upto 100 °C and readability/accuracy of 0.1 °C and aluminum stirrer (don't take copper stirrer). Measure 5 mL of 80% phenol into the hard glass tube. Separately, fill a burette with water. Add 0.5 mL water into the tube containing phenol. Check the appearance of the solution (whether transparent or turbid. If the solution is not turbid, add another 1mL water). Hold a thermometer and stirrer (as demonstrated in the lab) in the tube and heat slowly on a water bath, stirring continuously. Note the temperature at which turbidity just disappears. Take out from the water bath and allow the tube to cool slowly while stirring. Note the temperature at which turbidity reappears. Then add another 0.5 or 1 mL more of water into the tube and repeat the experiment. Continue like this till a total of ~30 mL water is added. Plot the average miscibility temperatures against wt. percentage of phenol on a graph paper. The maximum point in the curve is the CST of phenol-water system.



Observation and Calculation: Volume of 80% phenol in water: 5 mL
(i.e., 1 g water added in 4 g phenol)

Vol. of water (mL)	Wt. % of phenol in water ((4/total vol.)x100)	Miscibility temperature (°C)		Average miscibility temperature (°C)
		Turbidity disappears	Turbidity reappears	
0.5	72.7			
0.5	66.7			

Results: CST of phenol-water system = ____ °C.
Critical composition = ____ % phenol in water.

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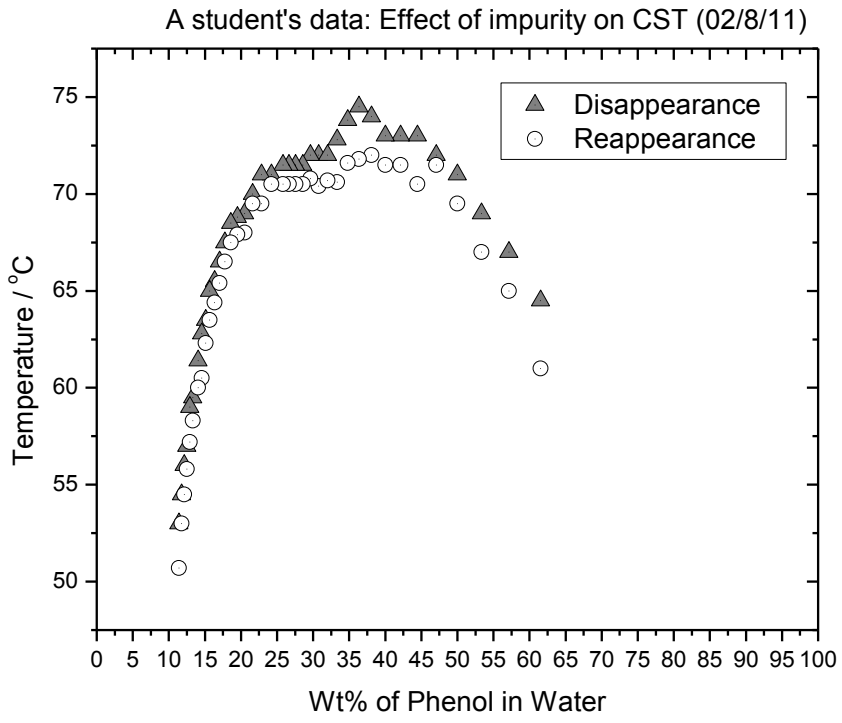
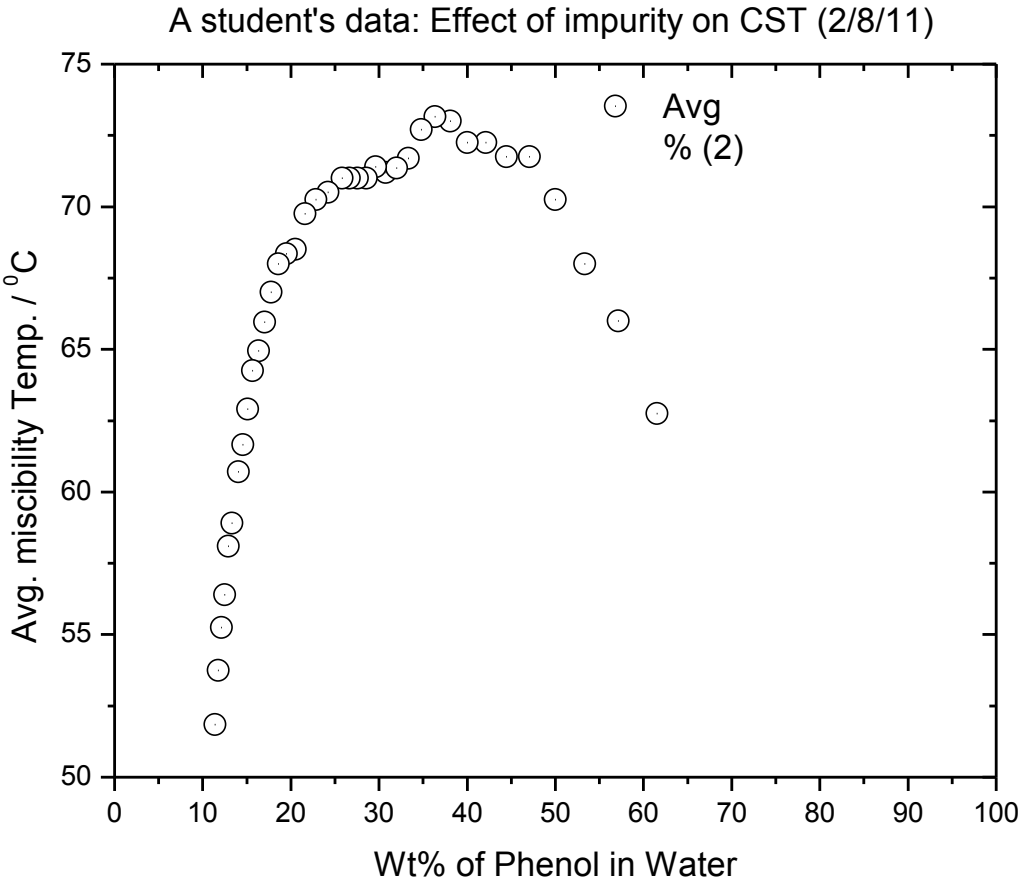
Extra Information:





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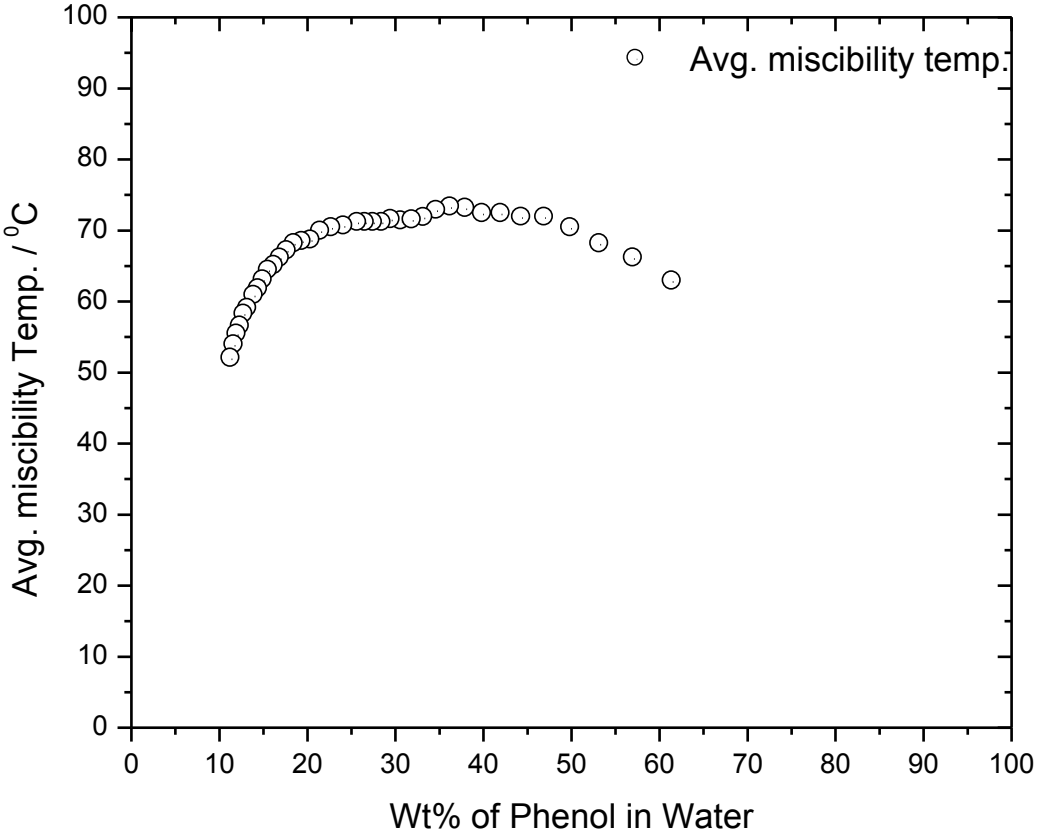

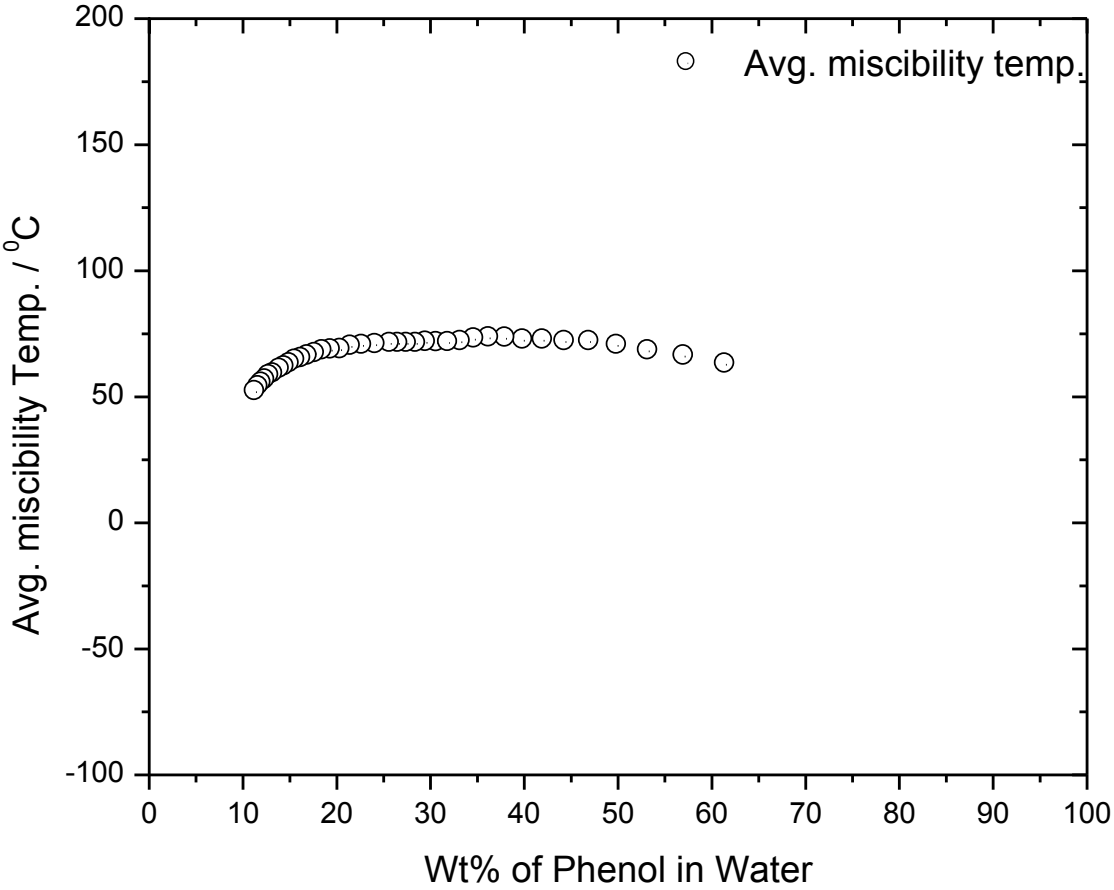

Comment: Above two figures show the importance of X-axis range. Data sets are same for all three figures.

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Experiment: 2

Aim: To determine the effect of impurity (KCl salt) on the Critical Solution Temperature (CST) of phenol-water system.

Observation:

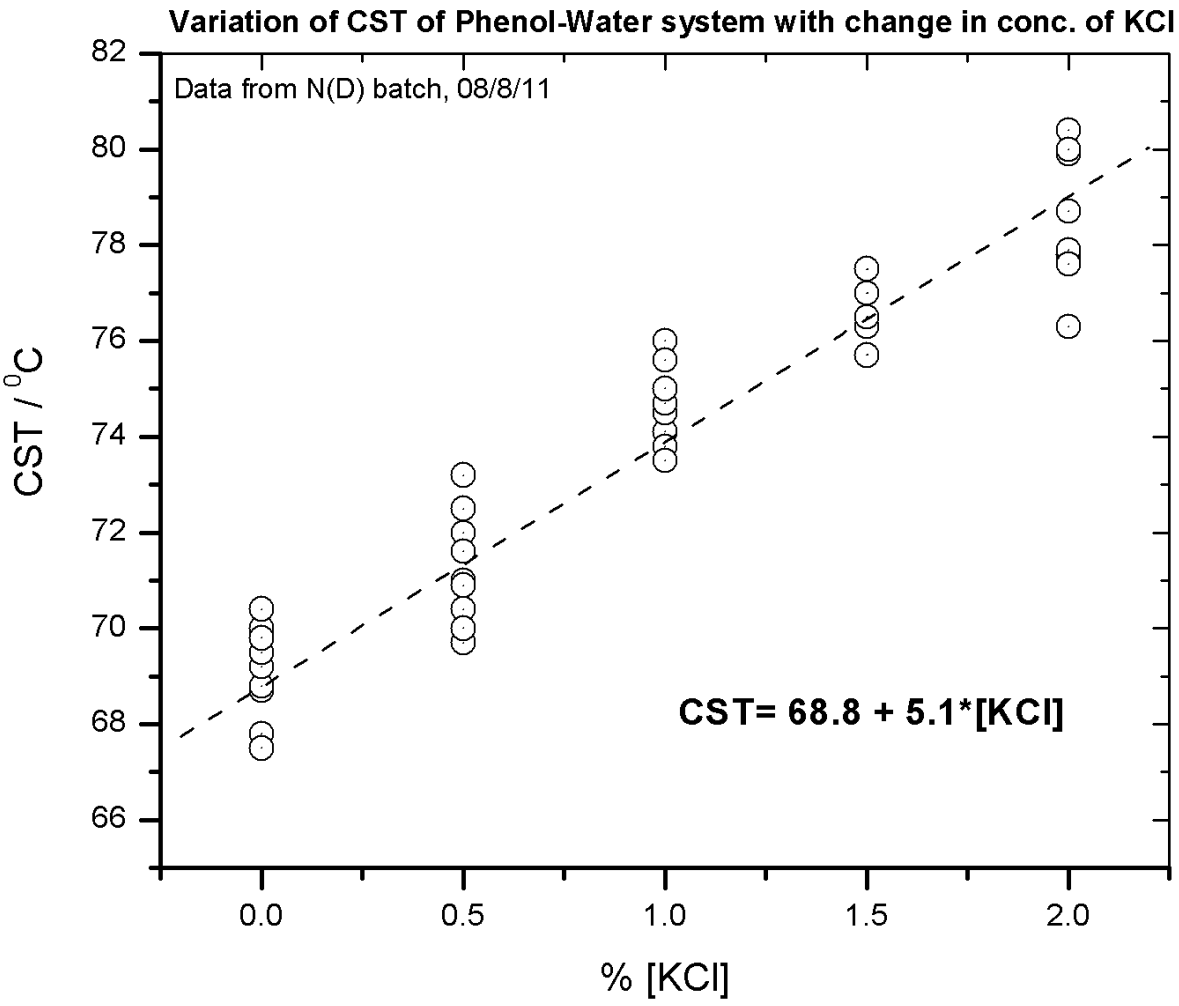

Figure: The influence of KCl concentration on the CST of Phenol-water system.

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