

Jan 14-8:08 AM

$(13.50g)$  1.5L 0.110M  $(NH_4)_2SO_4$

How much  $(NH_4)_2SO_4(s)$  needed? Find g

0.110 moles  $(NH_4)_2SO_4$

$0.110 \text{ mole } (NH_4)_2SO_4$	$1.5L$	$132 \text{ g } (NH_4)_2SO_4$	= <span style="border: 1px solid black; border-radius: 50%; padding: 10px;"><math>21.8g</math></span> $(NH_4)_2SO_4$
$1g$		$1 \text{ mole } (NH_4)_2SO_4$	

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$$\frac{M}{l} = \frac{M_{des}}{l}$$

$$\frac{0.11}{1} = \frac{M_{des}}{1.5}$$

Moles

$$\frac{Moles}{l} = \frac{g}{MW}$$

Moles

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13.44 Vitamin C -  $C_6H_8O_6$  }  $D = 1.225 \frac{g}{ml}$   
 80.5g  $C_6H_8O_6$  in 210g H<sub>2</sub>O } at 55°C

① Calc mass % Vit. C.

$$\frac{Part}{Whole} \times 100 = \frac{80.5g}{80.5 + 210} = 27.7\%$$

② Mole fraction  
 0.038

$$X_{VitC} = \frac{Mole\ VitC}{Total\ Mole} = \frac{\frac{80.5}{176}}{\frac{80.5}{176} + \frac{210}{18}}$$

③ Molality =  $\frac{Mole\ Solute}{Kg\ Solvent} = \frac{\frac{80.5}{176}}{0.210\ Kg} = 2.18\ m$

④  $M = \frac{Moles\ Solute}{l\ Soln} = \frac{\frac{80.5}{176}}{0.2381\ l} = 1.92\ M$

210  
80.5  
290.5g Soln

$\frac{290.5g}{1.225} = 236.1\ ml$

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## Colligative Properties

When a Solute is added to a Solvent

① Boiling Point

↑ HOT gets hotter

Pure H<sub>2</sub>O @ STP ⇒ 100°C

Salt Water BP > 100°C

≈ 102°C

$$\Delta T = (K \cdot m) \cdot i$$

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② Freezing Point

↓

Cold gets colder

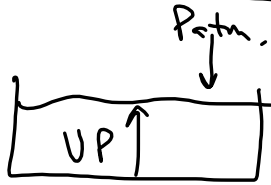
Pure H<sub>2</sub>O FP = 0°C

Salt H<sub>2</sub>O FP < 0°C

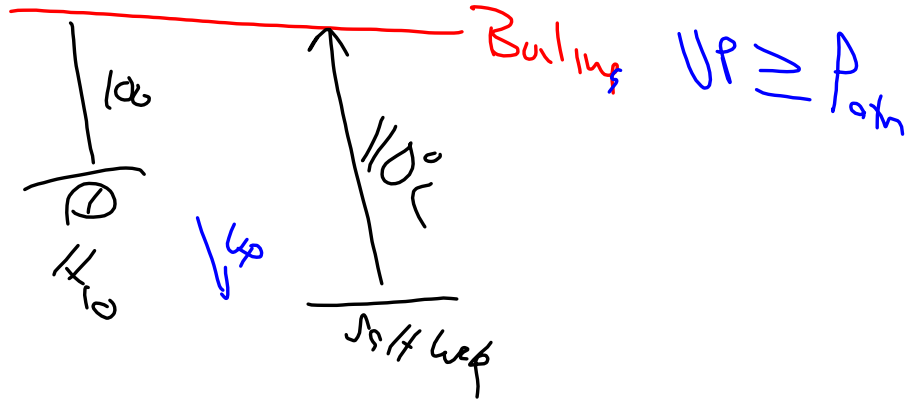
≈ -10°C

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③ Vapor Pressure



Since BP ↑  
it takes more Energy to boil



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④ Osmotic Pressure

$$\frac{13}{43 + 59}$$

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