

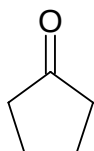
Chem 1C:**Extra credit opportunity!**

The question 5) on the white copy and the question 4) on the tan copy of Midterm II asked to identify a correct statement. The answer key points out that the anticipated correct statement is:

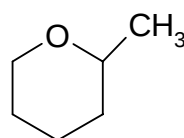
1) Solubility of most gases in liquids decreases as the temperature is increased

*This question was worded a little carelessly. It is true that solubility of most gases in water decreases as the temperature is increased. However, solubility of **some** gases in non-aqueous solutions increases. I did not cover this in the lecture but it is mentioned in the textbook.*

Here is some experimental data (Henry's constants, larger value indicates better solubility) on various gases in two quite different organic solvents at different temperatures. It comes from papers published by Dr. Urieta's group at Ciudad University, Spain.



Cyclopentanone			
TEMP	0 °C	20 °C	30 °C
He	0.47	0.62	0.69
Ne	0.66	0.81	0.89
Ar	6.24	6.35	6.40
Kr	21.8	19.2	19.1
Xe	107	85.1	75.8
H ₂	1.62	1.92	2.07
CH ₄	15.7	14.7	14.3
C ₂ H ₄	141	107	93.8
SF ₆	18.3	16.4	15.5
CO ₂	275	181	149



2-methyltetrahydrofuran			
	0 °C	20 °C	30 °C
He	0.82	1.06	1.18
Ne	1.29	1.58	1.76
Ar	12.9	12.8	12.7
Kr	43.7	38.0	36.6
Xe	218	165	146
H ₂	2.97	3.48	3.80
CH ₄	32.3	29.4	27.8
C ₂ H ₄	236	173	148
SF ₆	58.7	48.2	44.5
CO ₂	No data available		

I offer **5 point extra credit** that will be added to your Midterm II if you provide a rational explanation ***why the solubility of some gases in organic solvents increases as temperature increases but the solubility of other gases in organic solvents decreases as temperature increases.*** Your explanation should be based on concepts and ideas that you have learned in the Chem 1 series. For example, explanations copied out from advanced textbooks or research papers do not qualify. Anything goes: talk to your favorite professors, read online publications, post questions to online forums ... However, to get you started, you may want to read an old paper by Dr. Eley that provides some necessary data to solve the mystery. It is available online via our library (*Transactions of the Faraday Society*, 1939, 35, 1421 – 1432)
Partial credit of **2 pts** will be offered for ***identifying the underlying molecular property that determines the solubility behavior.***

Write your explanation to a piece of paper with your name and perm number and turn it in to me by noon on Wednesday, June 7th.