***Chemistry***

**11: Solutions and Colloids**

**11.3: Solubility**

17. Supersaturated solutions of most solids in water are prepared by cooling saturated solutions. Supersaturated solutions of most gases in water are prepared by heating saturated solutions. Explain the reasons for the difference in the two procedures.

Solution

The solubility of solids usually decreases upon cooling a solution, while the solubility of gases usually decreases upon heating.

19. Calculate the percent by mass of KBr in a saturated solution of KBr in water at 10 °C. See Figure 11.17 for useful data, and report the computed percentage to one significant digit.

Solution

At 10 °C, the solubility of KBr in water is approximately 60 g per 100 g of water.



21. At 0 °C and 1.00 atm, as much as 0.70 g of O2 can dissolve in 1 L of water. At 0 °C and 4.00 atm, how many grams of O2 dissolve in 1 L of water?

Solution

This problem requires the application of Henry’s law. The governing equation is .



Under the new conditions, ** = 0.70 g atm–1  4.00 atm = 2.80 g.

23. The Henry’s law constant for CO2 is 3.4  10–2 *M*/atm at 25 °C. What pressure of carbon dioxide is needed to maintain a CO2 concentration of 0.10 *M* in a can of lemon-lime soda?

Solution



25. How many liters of HCl gas, measured at 30.0 °C and 745 torr, are required to prepare 1.25 L of a 3.20-*M* solution of hydrochloric acid?

Solution

First, calculate the moles of HCl needed. Then use the ideal gas law to find the volume required.

*M* = mol L–1



*x* = 4.00 mol HCl

Before using the ideal gas law, change pressure to atmospheres and convert temperature from °C to kelvins.



*x* = 0.9803 atm



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