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8.11 pH and Solubility

AP Chemistry

Show your work. Use $K_w = 1.0 \times 10^{-14}$ at 25 °C.

1. $Mg(OH)_2$ has $K_{sp} = 5.6 \times 10^{-12}$. Calculate the pH of a saturated solution of $Mg(OH)_2$ at 25 °C.

2. Predict how the solubility of each salt changes when HCl is added. Then write one net ionic equation that explains your answer for CaF_2.

Salt	**Solubility when HCl is added (increases / decreases / no change)**
$Mg(OH)_2$	
$AgCl$	
CaF_2	
PbI_2	
$CaCO_3$	

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3. A buffer holds the pH at 10.00. Calculate the molar solubility of $Mg(OH)_2$ in this buffer. Is it more or less soluble than in pure water (1.1×10^{-4} *M*)? Explain.

4. A solution contains 1.0×10^{-3} *M* Mg^{2+}.

(a) Will $Mg(OH)_2$ precipitate if the pH is adjusted to 10.00? Show the calculation.

(b) What is the minimum pH at which $Mg(OH)_2$ begins to precipitate?

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