

6. Answer the following questions about Mg(OH)_2 . At 25°C , the value of the solubility product constant, K_{sp} , for $\text{Mg(OH)}_2(s)$ is 1.8×10^{-11} .
- (a) Calculate the number of grams of Mg(OH)_2 (molar mass 58.32 g/mol) that is dissolved in 100. mL of a saturated solution of Mg(OH)_2 at 25°C .
- (b) The energy required to separate the ions in the Mg(OH)_2 crystal lattice into individual $\text{Mg}^{2+}(g)$ and $\text{OH}^-(g)$ ions, as represented in the table below, is known as the lattice energy of $\text{Mg(OH)}_2(s)$. As shown in the table, the lattice energy of $\text{Sr(OH)}_2(s)$ is less than the lattice energy of $\text{Mg(OH)}_2(s)$. Explain why in terms of periodic properties and Coulomb's law.

Reaction	Lattice Energy (kJ/mol)
$\text{Mg(OH)}_2(s) \rightarrow \text{Mg}^{2+}(g) + 2 \text{OH}^-(g)$	2900
$\text{Sr(OH)}_2(s) \rightarrow \text{Sr}^{2+}(g) + 2 \text{OH}^-(g)$	2300