

Solubility Rules for Ionic Compounds

The following table will be given on the exam without the formulas in parentheses.

Compounds Containing the Following Ions Are Mostly Soluble	Exceptions
Li^+ , Na^+ , K^+ , NH_4^+	None
nitrate (NO_3^-), acetate ($\text{C}_2\text{H}_3\text{O}_2^-$)	None
chloride (Cl^-), bromide (Br^-), iodide (I^-)	When any of these ions pairs with Ag^+ , Hg_2^{2+} , or Pb^{2+} , the compound is insoluble
sulfate (SO_4^{2-})	When sulfate pairs with Sr^{2+} , Ba^{2+} , Pb^{2+} , or Ca^{2+} the compound is insoluble

Compounds Containing the Following Ions Are Mostly Insoluble	Exceptions
hydroxide (OH^-), sulfide (S^{2-})	When either of these ions pairs with Li^+ , Na^+ , K^+ , or NH_4^+ , the compound is soluble When sulfide (S^{2-}) pairs with Ca^{2+} , Sr^{2+} , or Ba^{2+} , the compound is soluble When hydroxide (OH^-) pairs with Ca^{2+} , Sr^{2+} , or Ba^{2+} , the compound is slightly soluble (for many purposes, these may be considered insoluble)
carbonate (CO_3^{2-}), phosphate (PO_4^{3-})	When either of these ions pairs with Li^+ , Na^+ , K^+ , or NH_4^+ , the compound is soluble

Solubility Rules for Ionic Compounds

The following table will be given on the exam exactly as shown here.

Compounds Containing the Following Ions Are Mostly Soluble	Exceptions
Li ⁺ , Na ⁺ , K ⁺ , NH ₄ ⁺	None
nitrate, acetate	None
chloride, bromide, iodide	When any of these ions pairs with Ag ⁺ , Hg ₂ ²⁺ , or Pb ²⁺ , the compound is insoluble
sulfate	When sulfate pairs with Sr ²⁺ , Ba ²⁺ , Pb ²⁺ , or Ca ²⁺ the compound is insoluble

Compounds Containing the Following Ions Are Mostly Insoluble	Exceptions
hydroxide, sulfide	When either of these ions pairs with Li ⁺ , Na ⁺ , K ⁺ , or NH ₄ ⁺ , the compound is soluble When sulfide pairs with Ca ²⁺ , Sr ²⁺ , or Ba ²⁺ , the compound is soluble When hydroxide pairs with Ca ²⁺ , Sr ²⁺ , or Ba ²⁺ , the compound is slightly soluble (for many purposes, these may be considered insoluble)
carbonate, phosphate	When either of these ions pairs with Li ⁺ , Na ⁺ , K ⁺ , or NH ₄ ⁺ , the compound is soluble
