Table 4.2  Solubility Rules for Common Ionic Compounds in Water at 25°C

<table>
<thead>
<tr>
<th>Soluble Compounds</th>
<th>Insoluble Exceptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compounds containing alkali metal ions ( (\text{Li}^+ , \text{Na}^+ , \text{K}^+ , \text{Rb}^+ , \text{Cs}^+ ) ) and the ammonium ion ( (\text{NH}_4^+ ) )</td>
<td>Halides of ( \text{Ag}^{+} , \text{Hg}_2^{2+} ), and ( \text{Pb}^{2+} )</td>
</tr>
<tr>
<td>Nitrates ( (\text{NO}_3^- ) ), acetates ( (\text{CH}_3\text{COO}^- ) ), bicarbonate ( (\text{HCO}_3^- ) ), chlorate ( (\text{ClO}_3^- ) ), and perchlorate ( (\text{ClO}_4^- ) )</td>
<td>Sulfates of ( \text{Ag}^{+} , \text{Ca}^{2+} , \text{Sr}^{2+} , \text{Ba}^{2+} , \text{Hg}_2^{2+} ), and ( \text{Pb}^{2+} )</td>
</tr>
<tr>
<td>Halides ( (\text{Cl}^- , \text{Br}^- , \text{I}^- ) )</td>
<td></td>
</tr>
<tr>
<td>Sulfates ( (\text{SO}_4^{2-}) )</td>
<td></td>
</tr>
</tbody>
</table>

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<th>Insoluble Compounds</th>
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<tbody>
<tr>
<td>Carbonates ( (\text{CO}_3^{2-}) ), phosphates ( (\text{PO}_4^{3-}) ), chromates ( (\text{CrO}_4^{2-}) ), sulfides ( (\text{S}^{2-}) )</td>
<td>Compounds containing alkali metal ions and the ammonium ion</td>
</tr>
<tr>
<td>Hydroxides ( (\text{OH}^-) )</td>
<td>Compounds containing alkali metal ions and the ( \text{Ba}^{2+} ) ion</td>
</tr>
</tbody>
</table>