

# Lead Chloride Solubility

## Lead Chloride Solubility ( $K_{sp}$ )

### MATERIALS

- 1L of 0.2M lead nitrate
- 1L of 0.2M sodium chloride
- Two 250mL graduated cylinders
- 1L distilled water
- 1L of a saturated lead chloride solution
- 1L of 1M HCl
- Large demonstration test tubes
- 2L waste beaker

### PRESENTATION

#### 1. *When $K_{sp}$ is exceeded*

- Mix about 100mL of 0.2M lead nitrate and 100mL of 0.2M sodium chloride in a large test tube
  - A precipitate of lead chloride will form
- The two concentrations (now 0.1M) will give an ion product greater than  $K_{sp}$  thus forming a precipitate

#### 2. *When $Q < K$*

- a. Make 100mL of 0.02M(1:10) lead nitrate from the 0.2M lead nitrate
  - b. Make 100mL of 0.02M(1:10) sodium chloride from the 0.2M sodium chloride
  - c. Mix the previous two solutions in a large test tube.
  - d. No precipitate will form.
- The two concentrations (now 0.01M) will give an ion product which is lower than  $K_{sp}$  resulting in no precipitate formation

### 3. **Common Ion Effect**

- a. Pour 100mL of sat. lead chloride into a large test tube.
  - b. Slowly pour 1M HCl into the test tube
  - c. A precipitate will form
- Because the lead chloride solution is saturated, the addition of more chloride ions will cause the lead chloride to precipitate. The ion product will exceed  $K_{sp}$

### **HAZARDS (MSDS Links)**

Lead chloride: <http://www.sciencelab.com/msds.php?msdsId=9924470> [1]

Sodium chloride: <http://www.sciencelab.com/msds.php?msdsId=9927593> [2]

Hydrochloric acid: <https://www.sciencelab.com/msds.php?msdsId=9924285> [3]

Lead Nitrate: <http://www.sciencelab.com/msds.php?msdsId=9924473> [4]

[Undergraduate](#) [5]

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**Links:**

- [1] <http://www.sciencelab.com/msds.php?msdsId=9924470>
- [2] <http://www.sciencelab.com/msds.php?msdsId=9927593>
- [3] <https://www.sciencelab.com/msds.php?msdsId=9924285>
- [4] <http://www.sciencelab.com/msds.php?msdsId=9924473>
- [5] <http://www.chem.arizona.edu/taxonomy/term/11>