a WOW Lab

BLUEPRINT

Glowing Veggies

Additional Information

Below are tables that contain useful information for preparing the solutions. The molar mass and water solubility are provided for each of the salts, as well as the number of grams required to prepare 1 M and 4 M solutions. If preparing a more concentrated solution, simply multiply the grams required for the 1 M solution by the desired molarity.

	Molar Mass	Water Solubility in Grams
Sodium Chloride (NaCl)	58.4 g/mol	36 g/100 mL H_2O
Lithium Chloride (LiCl)	42.4 g/mol	17 g/100 mL H_2O
Magnesium Chloride ($MgCl_2$)	95.2 g/mol	54 g/100 mL H_2O
Potassium Chloride (KCl)	74.5 g/mol	34 g/100 mL H_2O
Copper (II) Chloride ($CuCl_2 \cdot 2H_2O$)	170.5 g/mol	76 g/100 mL H_2O

	Solutions - Required Grams and Percent of Solubility		
	100 mL 4 M sol'n [Ideal]	100 mL 1 M sol'n	1L 4 M sol'n
Sodium Chloride (NaCl)	23.40 g / 65.00%	5.85 g/16.25%	234.00 g / 65.00%
Lithium Chloride (LiCl)	16.96 g / 99.76%	4.23 g/24.88%	169.60 g / 99.76%
Magnesium Chloride ($MgCl_2$)	38.08 g / 70.52%	9.52 g/17.63%	380.80 g / 70.52%
Potassium Chloride (KCl)	29.80 g / 87.64%	7.45 g/21.91%	298.00 g / 87.64%
Copper (II) Chloride ($CuCl_2 \cdot 2H_2O$)	68.20 g / 89.72%	17.05 g/22.43%	682.00 g / 89.72%

Fluorescent and Incandescent Lighting

Fluorescent and incandescent lighting are two of the most common types of lighting. Fluorescent lighting is a type of gas discharge lamp. This highly efficient lamp is used in neon signs, street lights and commercial lighting. Fluorescent lights, and gas discharge lamps in general, work by running electricity through a sealed tube filled with an element or mixture of elements in gaseous form. When a current is passed through the medium, it appears to glow because the electricity excites one or more valence shell electrons to jump to a higher energy level. When these electrons fall back to their original levels, they release light at a certain frequency. The colour is based on the emission spectrum of the elements present in the tube.

In streetlights, the medium is a liquid combination of sodium and mercury. It gradually vaporizes as the temperature in the discharge tube rises when a current is applied. As the current passes through the sodium ions in the mixture, they emit two light at two wavelengths, both around 590 nm. This produces a very bright yellow light. The mechanism on which gas discharge lamps are based is additionally a powerful method for identifying unknown pure samples of elements. In the traditional flame test, samples are held over the open flame of a Bunsen burner, causing them to ignite. The heat excites valence electrons, which causes the sample to emit radiation. The observed colour of the flame is based on the emission spectrum of that particular metal. Because each element has a unique emission spectrum, analyzing this radiation allows us to identify what elements are present in a sample.