

Scientific  
Education

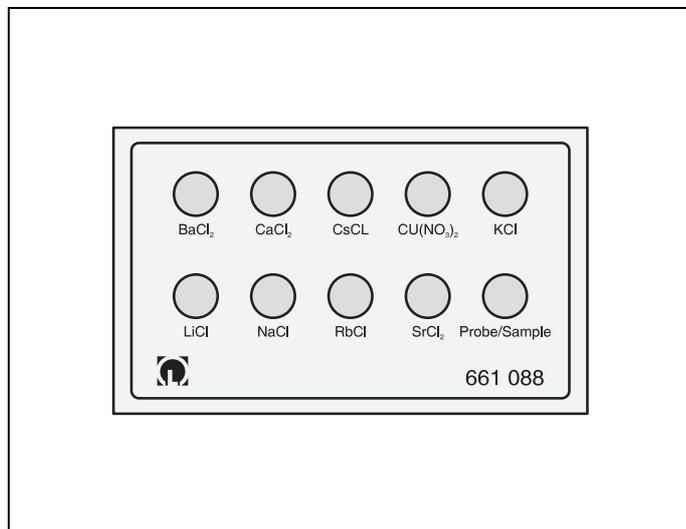
Technical Training  
and Education

Trade



LEYBOLD DIDACTIC GmbH

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## Instruction sheet 661 088

### Salts for Flame Tests (661 088)

The salts of several metals, particularly the alkali metals and the alkaline earth metals, demonstrate characteristic light emissions in the visible range following thermal excitation (e.g. in a non-luminous flame).

#### 1 Safety notes

Barium chloride is hazardous to health when inhaled and poisonous when swallowed.

Calcium chloride is irritating to the eyes. Do not breathe the dust. Avoid contact with skin. Copper (II)-nitrate and lithium chloride are hazardous to health when swallowed. They are irritating to the eyes and skin.

The flame test should be carried out in a non-luminous flame (e.g. under a full air supply through the burner chimney). Do not allow any salt crystals to fall into the Bunsen burner, as this can prevent color purity.

#### 2 Scope of supply

Barium chloride BaCl	4.0 g
Calcium chloride CaCl <sub>2</sub>	2.5 g
Cesium chloride CsCl	2.0 g
Copper (II)-nitrate Cu(NO <sub>3</sub> ) <sub>2</sub>	2.5 g
Potassium chloride KCl	3.0 g
Lithium chloride LiCl	2.0 g
Sodium chloride NaCl	3.0 g
Rubidium chloride RbCl	1.5 - 2.0 g
Strontium chloride SrCl <sub>2</sub>	2.5 g
Empty sample bottle	
Tray	

#### 3 Using the salts

Place a small sample of the salt (just a few crystals) in a depression of the porcelain spotting tile (667 089). Add a few drops of HCl to a different depression. Moisten the tip of a magnesia rod (from 667 084) with HCl, pick up a few crystals of the salt to be studied and hold them in the flame using the rod.

The flame takes on a characteristic color.

Li	red	Ca	dark red
Na	yellow	Sr	crimson
K	violet	Ba	green
Rb	red-violet	Cs	blue
Cu	green (with Cl <sup>-</sup> present)		
	blue (pure copper nitrate)		

To conduct a test with a different salt, break off the dirty tip of the magnesia rod and pick up the new salt as described above.

Even slight traces of sodium salts turn the flame yellow and obscure all other emissions. For this reason, absolute cleanliness is essential in the experiments. The yellow color of the sodium flame can be filtered out in qualitative experiments using the flame test glass (667 081), so that e.g. the presence of potassium can be inferred in spite of the presence of sodium.

If the flame is observed using a spectroscope with wavelength scale (667 339), it is possible to observe the spectral distribution of the flame color as an emission spectrum. The spectra of the individual ions can be recognized using a spectrum chart (e.g. 667 710 or 667 711). The following characteristic lines occur (the following are only the most important lines with their wavelength in nm):

Li	670.8 (red)
Na	589.3 (yellow)
K	786.3 (red); 404.4 (violet)
Rb	780.0 (red); 794.8 (red); 420.0 (violet)
Cs	458.0 (blue)
Ca	622.0 (red); 553.3 (green)
Sr	604.5 (orange); 460.7 (blue); multiple red lines
Ba	524.2 (green); 513.7 (green)
Cu	510.5; 515.3; 521.8 (all green)