## OPERATIONS.

## PHOSPHOR-SALT.

The glasses produced by the fusion of constituent bodies with this reagent are for the greater part identical with those obtained by the use of borax, although somewhat less deeply coloured as a general rule. The principal exceptions are the glasses formed in a reducing flame with compounds of molybdenum, tungstenum, and titanium, respectively. The molybdenum glass presents, when cold, a fine green colour, and the tungstenum glass becomes greenish-blue. If the latter contain iron, the colour of the glass is changed to blood-red or brownish-red. Titanium in the presence of iron gives a similar reaction; but when free from iron, the glass is yellow whilst hot, and violet-coloured when cold. Phosphor-salt is an important reagent for the detection of silica in silicates, as the silica remains for the greater part undissolved in the glass, in the form of a translucent flocculent mass, technically known as a "silica skeleton," the associated constituents being gradually taken up by the flux. A small amount of silica is also generally dissolved. but this is precipitated as the bead cools, rendering it semi-transparent or opaline. Phosphor-salt is likewise employed for the detection of chlorides, &c. (See under REACTIONS, § 5.) In other respects, it is especially adapted for fusions on charcoal, as it does not spread out like borax, but forms a globule on the support.

## CARBONATE OF SODA.

This reagent is principally used to promote the reduction of oxidized and other bodies to the metallic state, as explained below, under that process, It is also of very frequent employment as a test for sulphur in sulphides and oxidized bodies. (See under REACTIONS, § 5.) It is rarely used, on the other hand, for the formation of glasses on platinum wire, except as a test for the presence of manganese; although, when employed in this manner, it serves to distinguish salts of the alkalies, and those of strontia and baryta, from all other salts : the alkalies, with baryta and strontia, dissolving completely and rapidly in the bead, whereas lime, magnesia, alumina, and other bases, remain unattacked. Manganese compounds form by oxidizing fusion with this reagent a green glass, which becomes blue or bluish-green and opaque on cooling. A very minute amount of manganese may be thus detected. The delicacy of the test is increased by the addition of a small quantity of nitre, as this promotes oxidation; and if the substance contain much lime, magnesia, iron oxides, or other bodies more or less insoluble in carb. soda, it is advisable to add a little borax to the test-mixture. The blue or bluish-green bead thus produced, is technically known as a "turquoise enamel." Chromium compounds produce a somewhat similar reaction; but if the bead be saturated with silica or boracic acid, it will remain green in the latter case ; while if the green colour result from the presence of manganese, a violet or amethystine glass will be obtained. Some other applications of carbonate of soda as a blowpipe reagent will be found under the head of REACTIONS, § 5.

(8) *Reduction.*—This term denotes the process by which an oxidized or other compound is converted into the metallic state. Some com-

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