

## RECOVERY OF SILVER FROM SILVER CHLORIDE RESIDUES.

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The silver from any silver residue or solution can be easily precipitated as the chloride. Some silver electro-plating experiments in this laboratory gave silver chloride residues which were treated in various ways for the recovery of the metallic silver. One of the schemes was so satisfactory that it is described in this paper.

Metallic zinc and hydrochloric or sulphuric acid will reduce silver chloride to metallic silver. The objection to this method is that it introduces any impurity which is in the zinc into the metallic silver. Also the finely divided precipitate of silver is very difficult to filter and to wash free from the zinc salts.

If silver chloride is boiled in sodium hydroxide solution with glucose or other reducing sugar, it is reduced to metallic silver. The very serious objection to this method is that the finely divided silver is exceedingly difficult to filter and wash free from the sodium chloride.

The method which has given the best results in this work is an electrolytic reduction scheme. The silver chloride was filtered and was washed free from soluble salts. The silver chloride, after drying, was transferred from the filter paper to a porcelain crucible and fused with a Bunsen burner. One end of a platinum wire was dipped into the fused mass just as it began to solidify. This crucible, containing the silver chloride, was suspended by the platinum wire into a dilute sulphuric acid solution. This platinum wire was connected as cathode. A platinum foil served as anode. The electric current should not be strong enough to heat the solution, since this would cause platinum to dissolve from the anode. After several hours of electrolysis, the crucible either drops away from the partially reduced silver chloride or may be removed easily by pushing with a rod. The electrolysis was continued until the large amount of hydrogen evolved from the cathode showed that the silver chloride was largely reduced. The electrolyte was changed, at intervals of several hours, until the odor of chlorine could not be detected in the gases which were given off. The reduced silver, which retained the shape of the cru-

cible, was suspended in distilled water until the sulphuric acid of the electrolyte was washed out. This pure silver was then ready for use again.

The advantages of this method are :

1. No metal or other impurity is introduced during the reduction.
2. The silver which is obtained in a firm condition can be very easily handled. This avoids the very troublesome filtration of finely divided slimy silver, which is obtained by reduction with glucose.

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