

GOVERNMENT OF INDIA : THE PATENT OFFICE, 214, ACHARYA  
JAGADISH BOSE ROAD, CALCUTTA-17. Complete specification  
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dated 22nd December 1976. Acceptance of the complete speci-  
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"Dezincing of steel scrap by leaching with  
inhibitor impregnated acid".

Council of Scientific and Industrial Research,  
Rafi Marg, New Delhi-1, India, an Indian Registered Body  
incorporated under the Registration of Societies Act,  
(Act XXI of 1860).

The following specification particularly describes  
and ascertains the nature of this invention and the manner  
in which it is to be performed :-

This is an invention by Dr. Prem Behari Mathur and  
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PRICE - Rs.2.00

This invention relates to utilisation of waste iron scrap.

This has a reference to the steel scrap industry wherein the scrap coated with zinc needs removal of zinc before it can be used in steel plants.

Hitherto it has been the practice to export this scrap or to burn it to recover steel free from zinc coating.

This is open to objection that the burnt scrap is not always completely free zinc. The zinc coated scrap as such has no value for steel plants and so it is necessary that the zinc should be completely recovered from scrap before it is rendered useful for steel plants.

The object of this invention is to obviate these disadvantages by developing a process of preferential leaching of zinc from iron without attacking the base metal iron in acidic medium and thus obtaining zinc free steel scrap and incidentally valuable zinc metal or its compounds.

To these ends, the invention consists of a process for the production of zinc free steel scrap and zinc metal or its salts from galvanised steel which is characterised in that the galvanised steel scrap is leached in an organic inhibitor impregnated hydrochloric or sulphuric acid, the organic inhibitor consisting of a dilute (0.25% to 2%) solution of formaldehyde. Thus in the process of leaching zinc from steel scrap, the electrolyte is a mixture of an acid like hydrochloric or sulphuric acid and inhibitor, formaldehyde. 2% to 0.25% of the inhibitor is used in a 30% to 5% acid solution.

The following are among the main advantages of the invention:

1. The coated zinc alone is preferentially dissolved from the steel scrap without attacking the base metal.
2. The process is extremely fast as an acid is used in leaching operation.
3. The mother liquor obtained after leaching the scrap is a useful byproduct.

4. The plant design involves low cost.

The following typical examples are given to illustrate the invention:

Example 1

50 litres of 30% hydrochloric acid is impregnated with 0.2 to 1.5% of formaldehyde. 10 kg of scrap is dipped to the above solution. The scrap was de-zincd within 20 minutes. The scrap left out was free from zinc. 0.5 kg to 1 kg of zinc salt is crystallised out.

Example 2

The process is carried out as described in example 1, with the exception that the concentration of hydrochloric acid is changed from 30% to 20%. Same results are obtained.

Example 3

The process is carried out as described in previous examples with the exception that the concentration of hydrochloric acid is changed to 10%. Same results were obtained.

Example 4

As described in any of the previous experiments, the scrap is de-zincd in an inhibitor impregnated acid medium with the exception that the acid is changed from hydrochloric acid to sulphuric acid. 1 kg to 2 kgs of zinc salt is crystallised out.

Example 5

As described in any of the previous experiments, the scrap is de-zincd in an inhibitor impregnated acid medium with the exception that the solution thus obtained is electrolysed to recover nearly 300 to 400 grams of zinc as zinc metal instead of zinc salt.

We claim:

1. The process for the production of zinc free steel scrap and zinc metal or its salts from galvanised steel which is characterised in that the galvanised steel scrap is leached in

hydrochloric acid or sulphuric acid solution of 25% to 33% concentration, containing an organic inhibitor, formaldehyde in the concentration range of 0.25% to 2% wherein the de-galvanising is carried out within 15°C to 45°C.

2. A process as claimed in any of the previous claims, wherein the zinc salt is crystallised out from the mother liquor.

Dated this 20<sup>th</sup> day of December, 1976

R. Bhaskare Bai

PATENTS OFFICER,  
Council of Scientific & Industrial Research.