

THE USE OF ELECTROTHERMAL CRYSTALLIZER FROM CLEAN TECHNOLOGY POINT OF VIEW FOR Sn REFINING

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Antecedents

The National Smelter Enterprise (ENAF), started on 1970 with High Grade Vinto Tin Smelter, Oruro – Bolivia

Built up the Low Grade Smelter on 1979.

In 90's, the acquisition of Continuous Electrothermal Crystallizer has done.

Pb and Bi elimination alternatives

Thermal Refination. Pb by chlorination, and Bi with Ca and/or Mg.

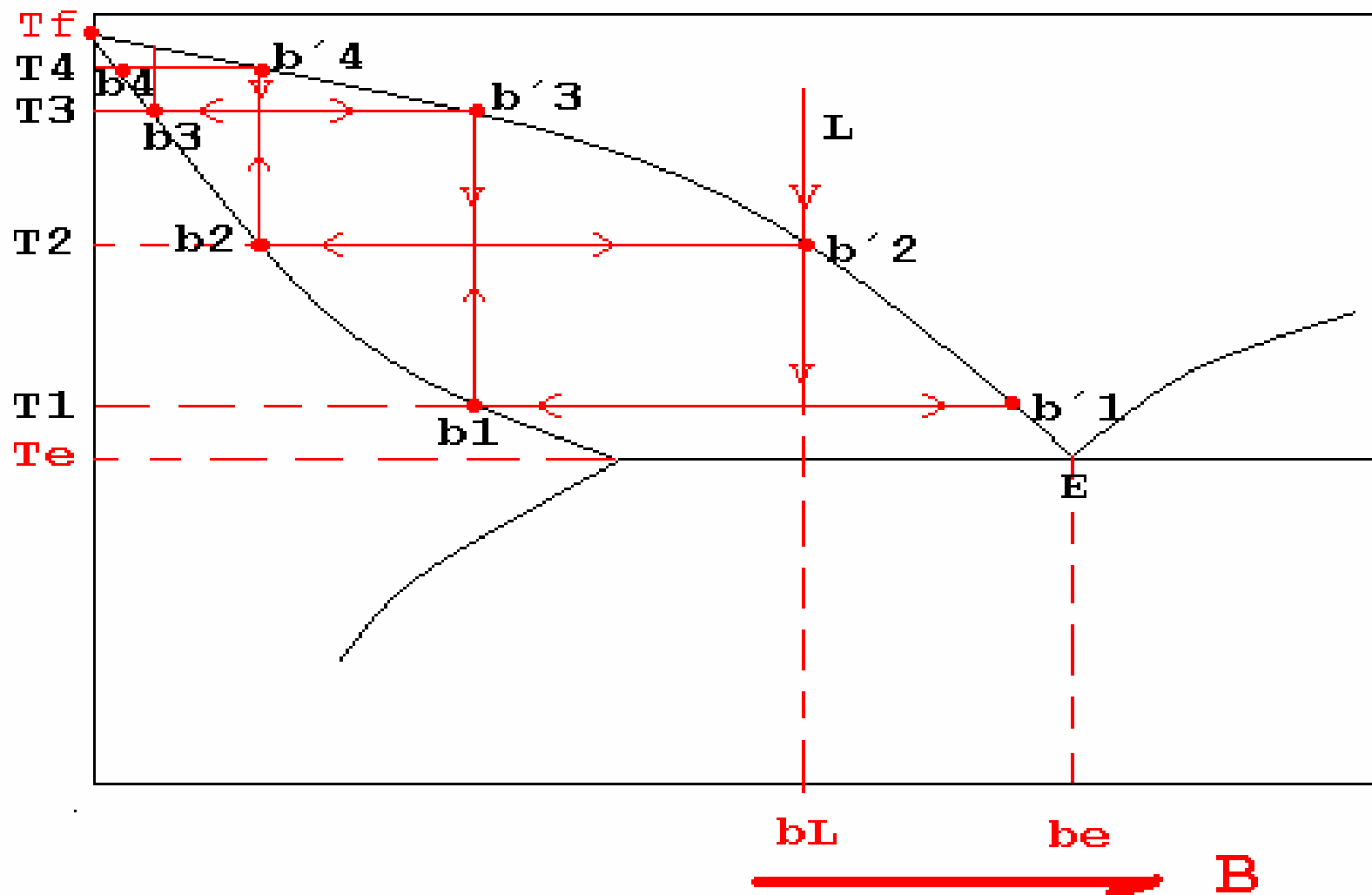
Vacuum Refining

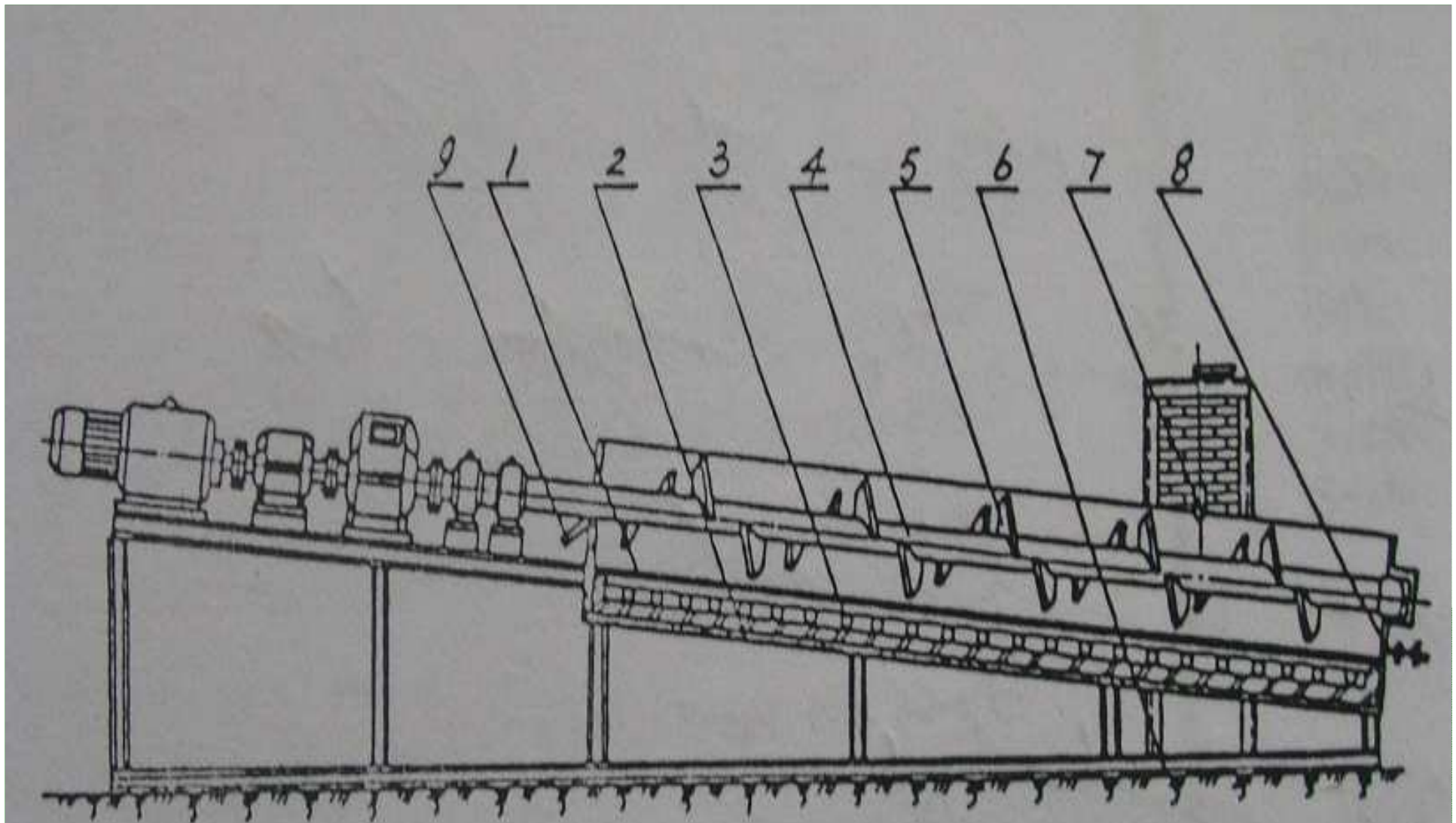
Roast with NaCl, previous reduction.

Electrolitic Refining.

Continuous Electrothermal Crystallizer.

Brief Description of Crystallizer





1,2,3 = Heating system

7 = Hot gas off-take and feed

4 = Crystals Collector spiral

8 = Liquid alloy

5 = Spiral ladles

9 = Pure crystals.

6 = Basement

Comparative Advantages

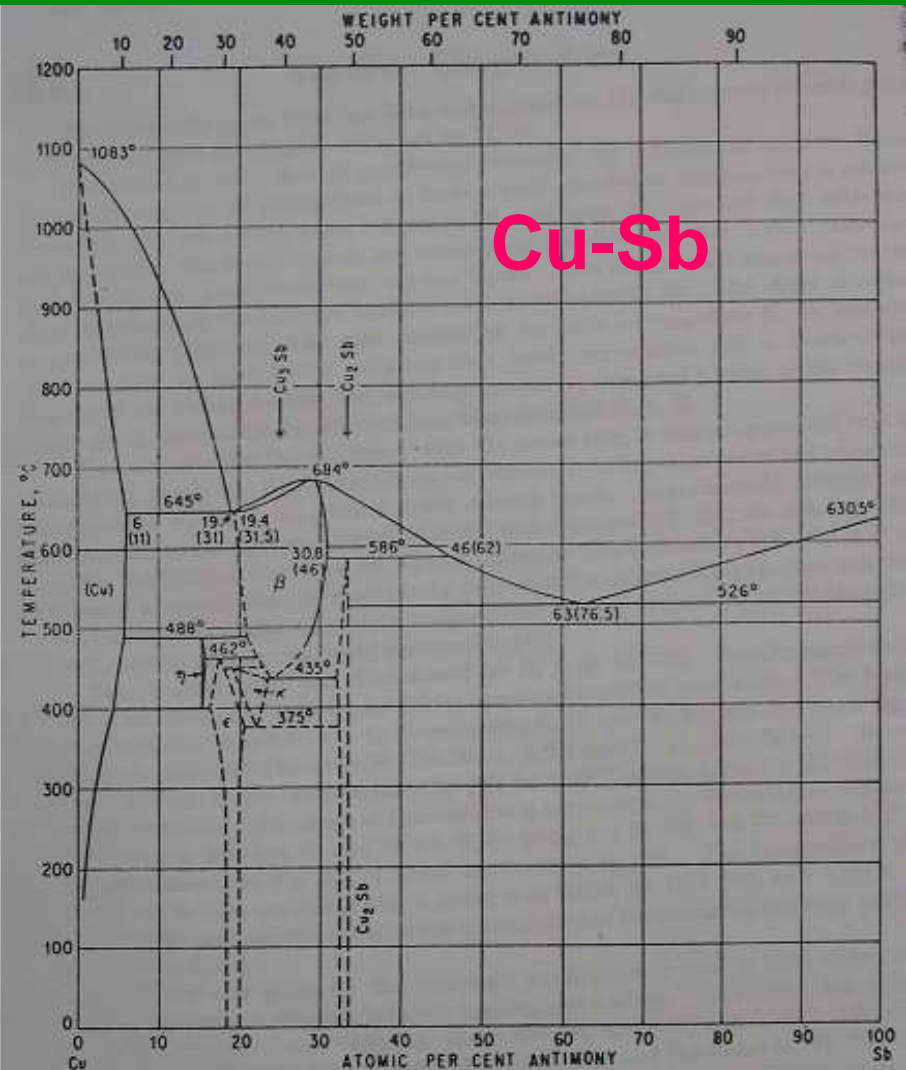
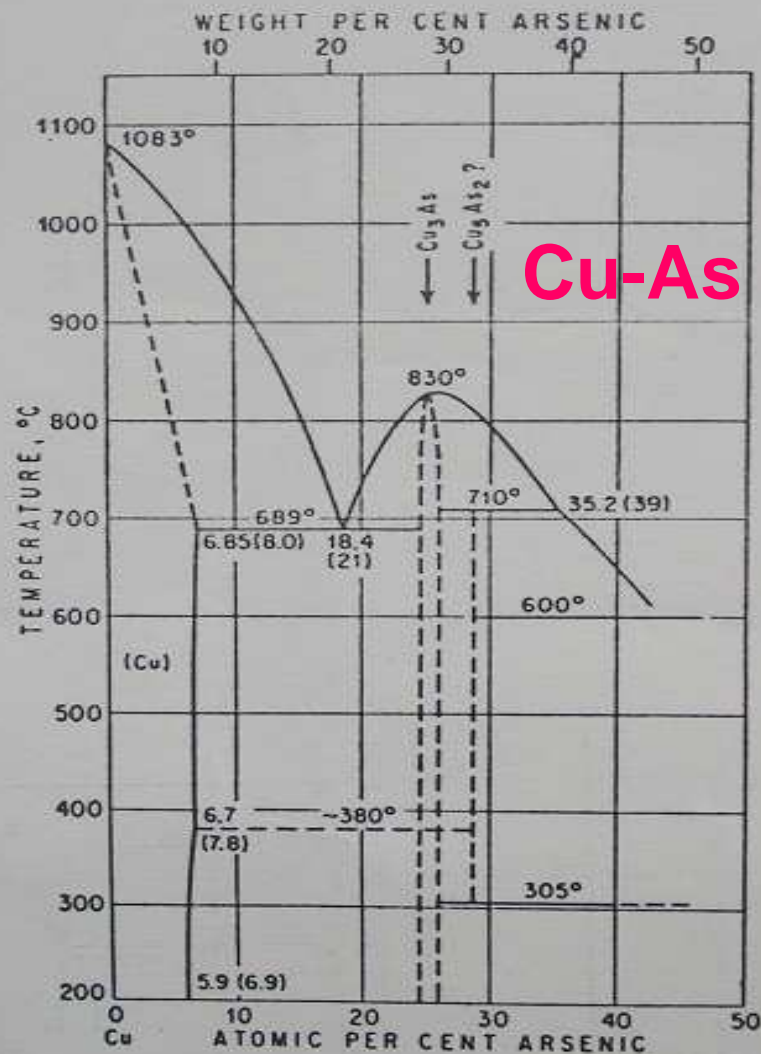
The quality of tin accomplish the international specifications.

Working Temperatures below 232 °C

The refined crystals and impurities alloy are marketable.

The gases produced are only low temperature metallic vapours

APPLICATION TO REFINE OTHER METALS



CONCLUSIONS

Low energy consumption.

No requirements to store or recycle by-products (external and internal accumulation)

Low gases production.

By-products without additional chemical reagents, including gases.

ACKNOWLEDGEMENTS

- ALFA/TECLIMIN Project**
- Metallurgical and Materials Research
Institute – UMSA – La Paz, Bolivia.**

AND OFF COURSE: THE ATTENDANTS

04.12.2006 18:09

