

# LOW MELTING GLASSES

The logo for Glafo is rendered in a bold, rounded, orange-red font. The letters are thick and have a slightly irregular, hand-drawn appearance. The 'G' is particularly large and prominent, followed by 'l', 'a', 'f', and 'o'.

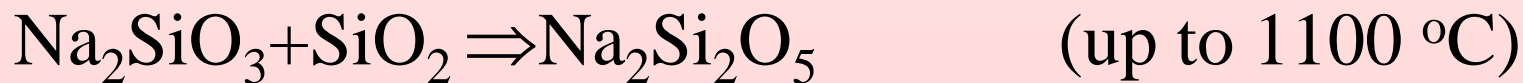
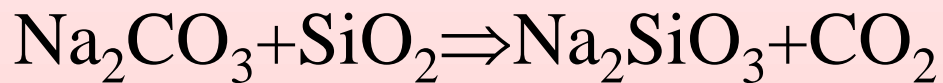
Lars Gunnar Johansson

# MELTING PROCESS

Solid phase reactions:



Silicate reactions:



# Low Melting Glasses

## OBJECTIVE:

Develop low melting glasses to save about 15 % of energy

## HOW?:

By lowering the melting temperature and the working temperature with 100 °C

# Laboratory melting

Develop glasses with acceptable properties

- Melting
- Viscosity
- Thermal properties
- Refining
- Decolorisation
- Chemical properties

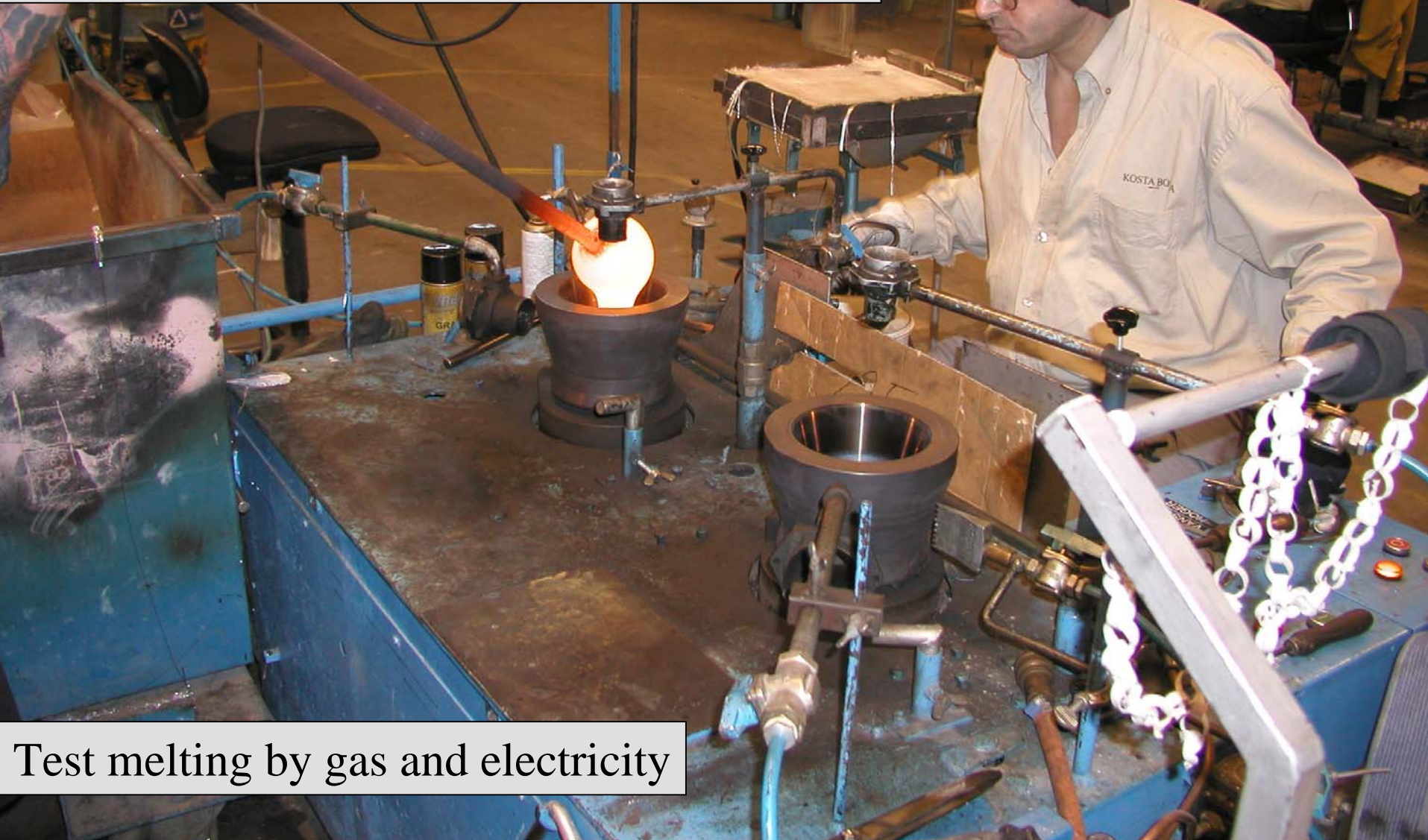


# PILOT MELTING

20 l sillimanite pot  
40 kg of glass

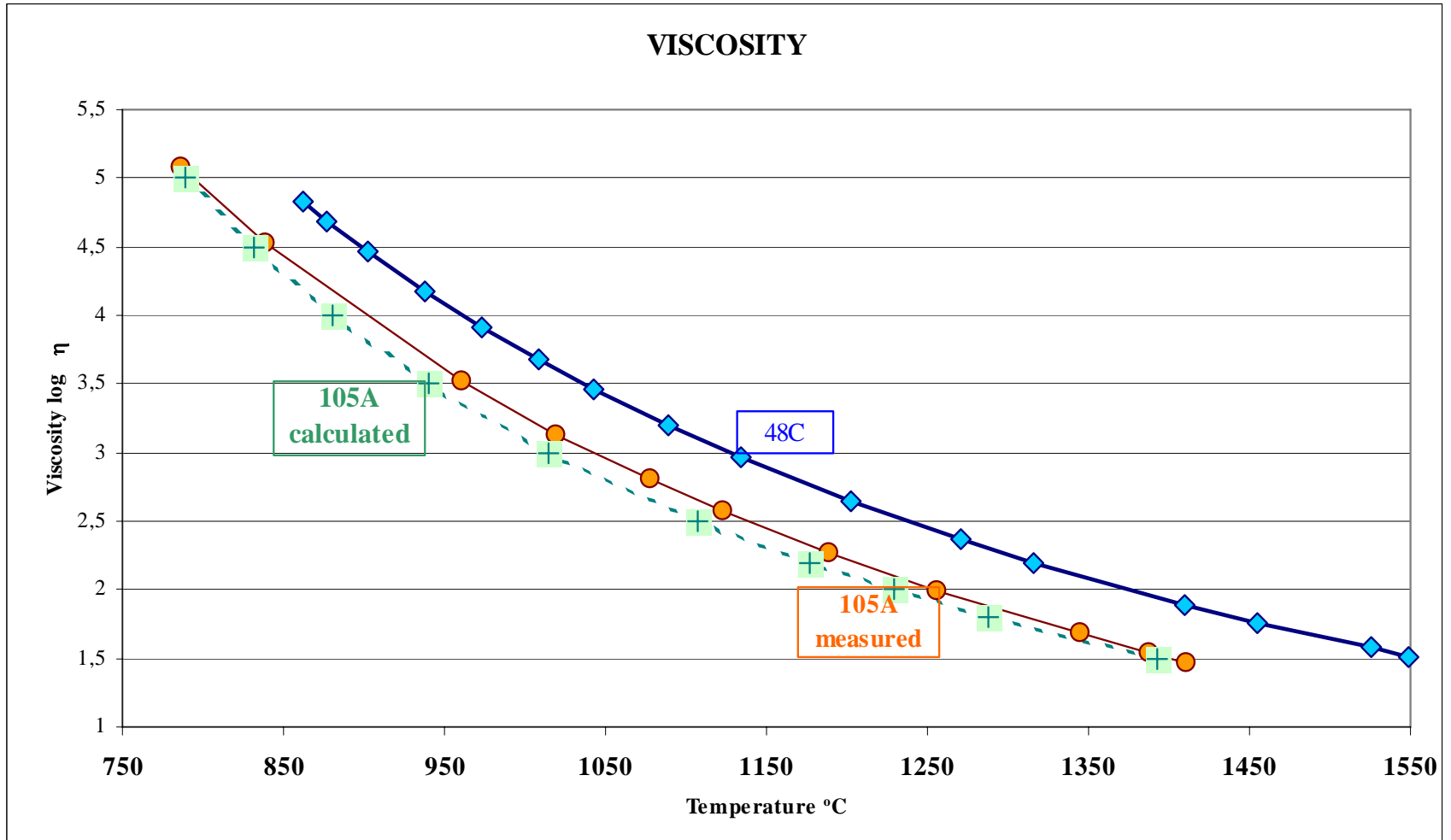


# PRODUCTION OF LOW MELTING GLASSES KOSTA



Test melting by gas and electricity

# Example of a low melting glass melted in full scale



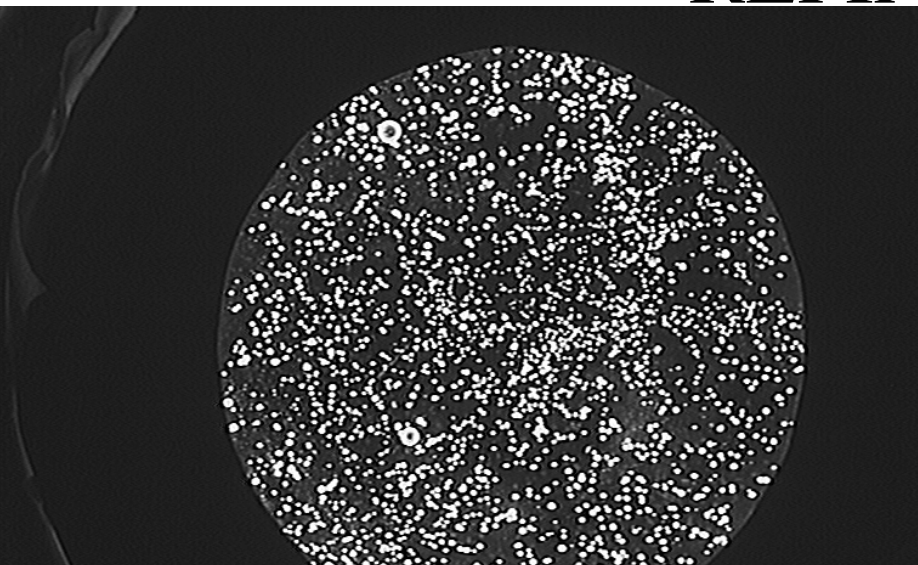
# SOME ITEMS MADE OF LOW MELTING GLASSES



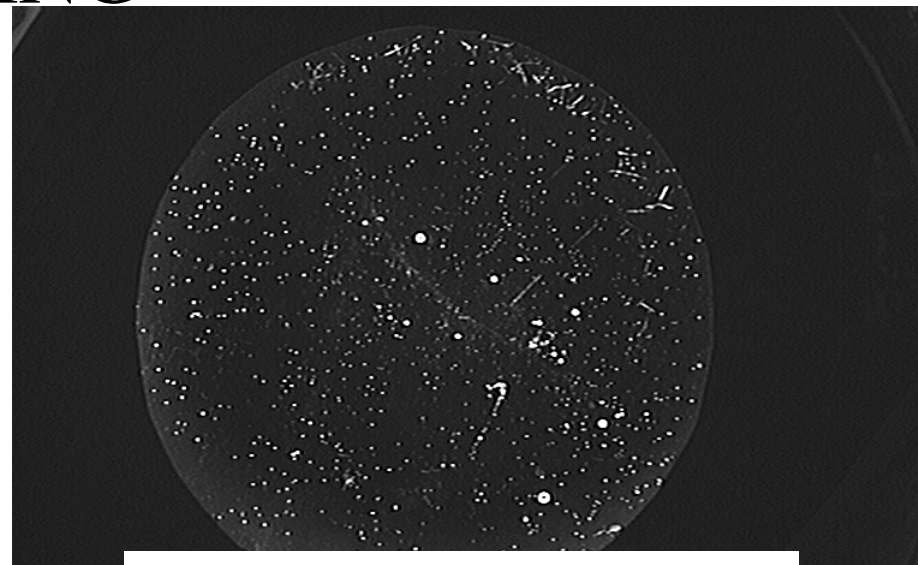
# Conclusions

- +Melting and working properties are good, -100 °C
- +Lower energy consumption, 10-15 %, one single day -17 %
- +Better working environment – lower temperature
- +Less problems against mould material
- +Softer glass, advantages for processing in the cold state
- +Adjusted for pelletising
- +Less corrosion to refractory material
- +Thermal shock unchanged
- +Good dish washing resistance. Unexpected positive advantages with non-phosphate detergent.
  
- More expensive raw materials, increased batch costs about 8 %
- Difficult refining, both with antimony and sulfate refining
- Higher thermal expansion, compatibility problems

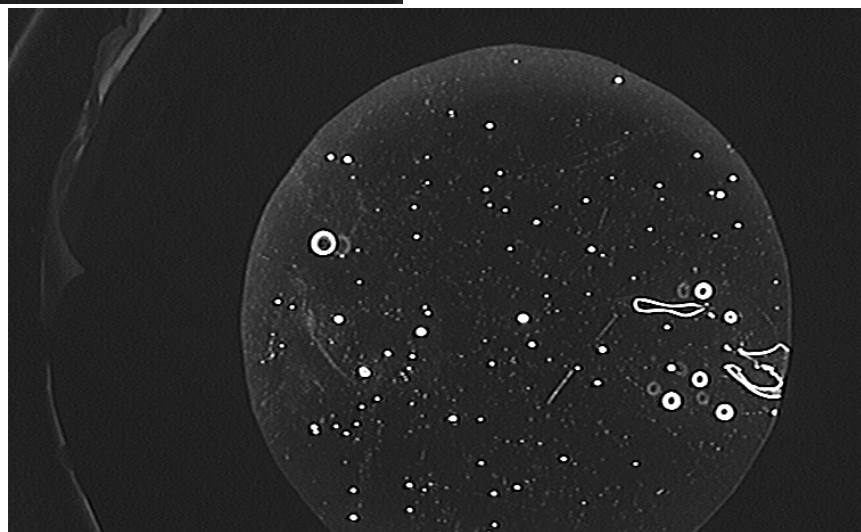
# REFINING



Antimony oxide + Na-nitrate



Na-sulfate+carbon



48C Antimony oxide+Na-nitrate

# **THIS PROJECT WILL BE CONTINUED IN THIS YEAR**

## **OBJECTIVES**

Better refining

Energy Saving minimum 15 %

Environment Improvements

Longer operation experience