

Extract from
THE SOCACHIM HANDBOOK OF FUSION METHODS

Iron Ore & Furnace Dust

Iron Ore-1 (Fe: 30-35%)

Flux: XRF Scientific LT100, LT66:MT34 & LT50:MT50

Additives to flux:

Oxidizer: LiNO_3

Non-wetting agent: 4 drops of Lithium Bromide solution (250g/l).

Dilution: the sample/flux/oxidizer ratio is about 1/10/1

Swirling: the mixture must be agitated normally. Swirl speed: 50

Fusion: Weigh 1 gram of dried/grinded samples, 10g of lithium borate flux, 1 grams of oxidizer and mix them together. The mixture is rigorously mixed to be sure the contact between sample and flux/oxidizer is perfect. The mixture is transferred into the crucible on the fusion machine and about 4 drops of lithium bromide is added on top of it. Start the fusion program.

When the cooling is finished, remove the bead from the mould.

Fusion Program:

- Premelt (preheating step): 3 minutes at 850°C
- Melting (without swirling): 1 minutes at 1150 - 1200 °C (*temperature depending of the flux type*)
- Melting (with swirling): 4 minutes at 1150 – 1200 °C (*temperature depending of the flux type*)
- Mould control (mould preheating step): 2 minute at 1100°C
- Cooling (bi-level cooling): T1= 1 minute — T2= 2 minutes
- TOTAL FUSION TIME: 11 minutes

Comments: Direct fusion of iron ores in molten borate flux is not possible.

All iron should be oxidized at their higher oxidation state and this for two major reasons:

1° iron Fe^0 is not soluble in borate flux

2° metallic iron forms with the platinum-gold crucible low fusible alloys having as consequence the rapid destruction of this expensive material.

For these reasons, an oxidation step is necessary and the fusion should be conducted in an oxidizing atmosphere. We therefore strongly suggest proceeding with an oxidation step followed by a fusion in oxidizing condition. This could be achieved by adding oxidizer such nitrate: lithium, potassium, sodium or strontium.