

Extract from
THE SOCACHIM HANDBOOK OF FUSION METHODS

Ferro alloy: METHOD 2 – preparation in 1 step

Ferro-Tungsten; Ferro-Vanadium; Ferro-Molybdenum; Ferro-Manganese; Ferro-Silicium

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

Additives to flux:

Oxidizer: mix of lithium carbonate/sodium carbonate/potassium nitrate - 1/1/1

Non-wetting agent: 2 drops of Lithium Bromide solution (250g/l).

Dilution: the sample/flux/oxidizer ratio is about 0.3/5/2.25

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

Fusion: Weigh 4 grams of lithium borate flux and introduce the flux into the crucible. Weigh 0.3 grams of dried/grinded samples, 2.25 grams of oxidizer, 1 gram of flux and mix them together. The mixture is rigorously mixed to be sure the contact between sample and oxidizer is perfect. The mixture is transferred into the crucible on the 4 grams of borate flux and about 2 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): 7 minutes at 850°C
- Melting (without swirling): 3 minutes at 1200 - 1250 °C (*temperature depending of the flux type*)
- Melting (with swirling): 4 minutes at 1200 - 1250 °C (*temperature depending of the flux type*)
- Mould control (mould preheating step): 2 minute at 1150°C
- Cooling (bi-level cooling): T1= 1 minute — T2= 2 minutes
- TOTAL FUSION TIME: 17 minutes

Comments: All ferro-alloys to be fused using this technique must be of fine particle size, i.e. less than 80µm.

Direct fusion of ferro-alloys in molten borate flux is not possible. The main reasons are that ferro-alloys will not readily dissolve and they attack and destroy the crucible metal. The present technique overcomes both problems to achieve the successful fusion of ferro-alloys.

NB: For Ferro-chromium

Dilution: the sample/flux/oxidizer ratio is about 0.2/8/3