Melting silicon in graphite crucible for material testing

Objective Melting ~ 2.1 oz (0.7g) silicon for a material testing application

Material ~ 2.1 oz (0.7g) silicon, graphite crucible 2.03" (51.6mm) OD, 1.02" (25.9mm) high with a wall thickness of .125" (3.2mm), insulation

Temperature 2552 ºF (1400 ºC)

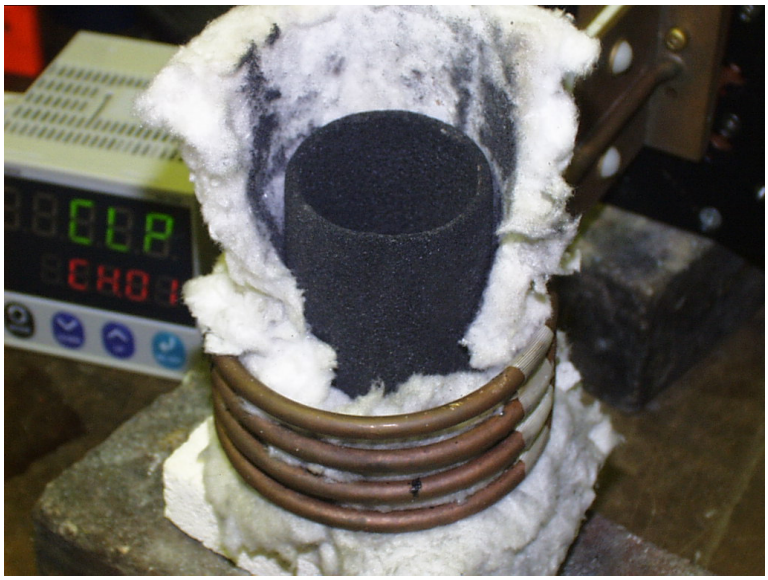
Frequency 196 kHz

Equipment
- Ambrell 6 kW induction heating system, equipped with a remote workhead containing two 1.0 µF capacitors for a total of 0.5 µF
- An induction heating coil designed and developed specifically for this application.

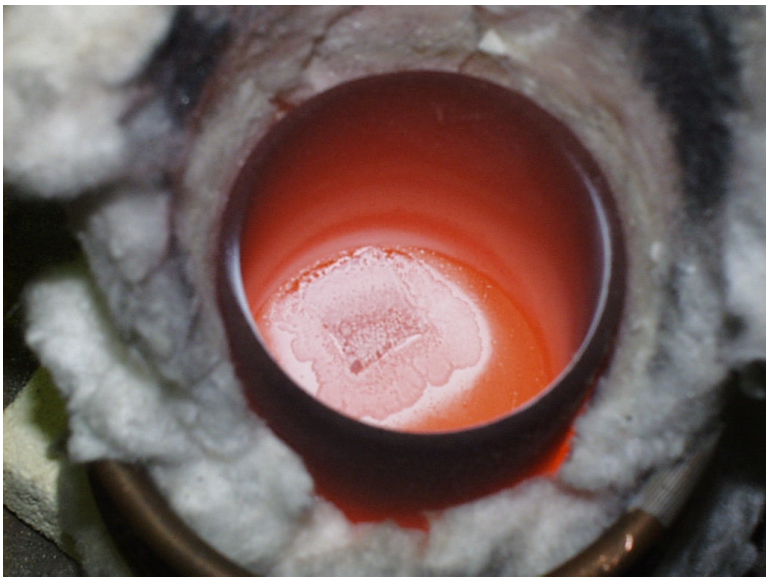
Process A four turn helical coil is used to heat the crucible. The crucible is wrapped with a layer of insulation and placed into the coil. Power is applied and the crucible reaches the required 2552 ºF (1400 ºC) in 1 minute and 12 seconds.

Narrative
- The customer is developing a university lab experiment to melt silicon and is still developing the process. Ameritherm equipment was recommended for the process by fellow coworkers that previously used Ameritherm equipment. Ameritherm's Scottsville lab proved the silicon can be melted in a graphite crucible and the melt temperature can be easily controlled using a temperature controller to control the power supply. The small remote workhead with the EASYHEAT 6 kW makes the system set up appropriate for a laboratory environment.

Results/Benefits Induction heating provides:
- Fast, controllable and accurate heat
- Repeatable results
- Even distribution of heating



Graphite crucible with insulation wrap



Crucible showing melted silicon