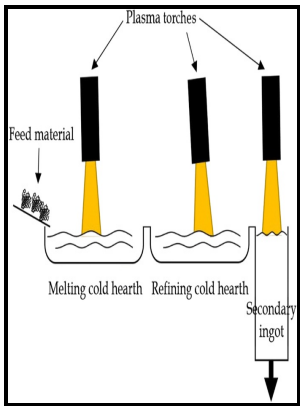
Sensing and controlling the plasma arc cold-hearth refining process

University of Birmingham - E



Description: -
-Sensing and controlling the plasma arc cold-hearth refining process
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Current processes for the cold

The method of bottom-pour cold hearth melting of a metal comprising providing a mass of solid metal, placing said metal in a container having the side walls thereof made of high thermal conductivity material and a bottom diaphragm wall, subjecting the mass of metal to melting at the top center of said mass to produce a continually deepening pool of the metal contained in a solidified mass of the metal and, when the depth of said pool has been extended to reach said bottom diaphragm wall, molten metal from said pool is discharged from said container under the application of pressure by an inert gas through a centrally-located orifice in said bottom diaphragm wall, using as at least the central portion of the structure of said bottom diaphragm wall of refractory metal nozzle containing said orifice, said metal diaphragm nozzle having an outer effective diameter of at least about 1. The optimal locations have then been determined to monitor die temperatures for the purpose of minimizing macro-porosity.

Quantification of the heat transfer during the plasma arc remelting of titanium alloys

This causes the massive current flowing through the coil, and stored energy in the magnet, to quickly convert into heat, and potentially cause serious internal damage to the coil. In this study, an f of 0. Due to its use in the as-cast state, the effect of casting porosity on the corrosion of B206 was investigated using a pencil electrode method.

Daan Maijer

From the second refining hearth 26 the molten pool of metal passes over another shallow lip 38 into an ingot mold 30. Although conventional cold hearth melting processing operate at a slightly positive inert gas pressure of about 820 to 880 torr, the process of the present invention operates at subatmospheric pressure levels. Predictions for temperature history and liquid pool profile are in good agreement with the measured results from the experiment.

Current processes for the cold

This research presented in this thesis focused on developing and verifying an inverse heat transfer analysis methodology to characterize the heat flux distribution from a plasma torch.

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To explore this, an attempt has been made to fit the total heat flux profile using two superimposed heat flux distribution, both of which are assumed to follow a Gaussian distribution. Side surface The side surface of the test block is cooled via radiation to the inside wall of the mould. For the experimental setup, the plasma torch was positioned with a 6" standoff above the center of a block.

Plasma arc melting of titanium alloys

However, the challenge of composition control arises in processing alloys such as Ti-6Al-4V where evaporative loss of elements with higher vapor pressure Al in this case cannot be ignored.

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