



G00002

ABSTRACT



162162

PROCESSING OF NICKEL ALUMINIDE MATERIAL

A process for casting and preparing an ingot (10) of a beta-phase NiAl-based material, particularly for use in PVD coating processes. The method entails melting a nickel-aluminum composition having an aluminum content below that required for stoichiometric beta-phase NiAl intermetallic so as to form a melt comprising nickel and Ni₃Al. Aluminum is then added to the melt, causing an exothermic reaction between nickel and aluminum as the melt equilibrium shifts from Ni₃Al to NiAl. However, the aluminum is added at a rate sufficiently low to avoid a violent exothermic reaction. The addition of aluminum continues until sufficient aluminum has been added to the melt to yield a beta-phase NiAl-based material. The beta-phase NiAl-based material is then solidified to form an ingot (10), which is then heated and pressed to close porosity and homogenize the microstructure of the ingot (10).

Figure 1