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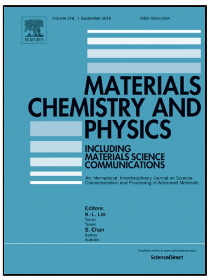

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Flow characteristics and deformation mechanisms for TiAl/Ti_2AlNb diffusion bonded joint

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Abstract

The hot deformation behavior and deformation mechanism of TiAl/Ti_2AlNb diffusion bonded(DB) joint in the temperature range of 900℃~1000℃ and strain rate range of 0.001 s^{-1}~0.1s^{-1} were investigated by isothermal compression tests. The deformation may be related to the coordination deformation of the two alloys，with the deformation of Ti_2AlNb section coming firstly, followed by TiAl due to the existence of the DB interface. The flow behavior of DB joint can be expressed by the hyperbolic sine constitutive equation, and the calculated deformation activation energy Q is 343.5KJ/mol. The Q value almost equal to lattice diffusion coefficient(265~331KJ/mol) in O+B2 Ti_2AlNb alloy, which suggests the deformation mechanism could be controlled by lattice diffusion. Microstructure observation shows that, When deformed at 900℃-0.1s^{-1}, the deformation mechanism is grain boundary sliding accommodated by O-DRX in Ti_2AlNb, γ-DRX in TiAl, deformation twin and $\beta \rightarrow \alpha_2$ phase transformation. While the deformation mechanism is dislocation slip accommodated by

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