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The vacuum melted ɣ-TiAl (Nb, Cr, Si)-doped alloys and their cyclic oxidation properties

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ABSTRACT:

The ɣ-TiAl intermetallic alloy doped with Nb, Cr, and Si metals has been developed. It has emerged that the ternary Ti-48Al-2Nb and quinary Ti-48Al-2Nb-0.7Cr-0.3Si alloys yielded the best mechanical and cyclic oxidation properties. In particular, the quinary Ti-48Al-2Nb-0.7Cr-0.3Si alloy rapidly developed the protective stable Al_2O_3 oxide doped with nitrogen and titanium oxynitride during cyclic oxidation. This showed a lower hardness when compared to the other alloys after cyclic oxidation. The oxide layer proved to have a good adhesive relationship with the parent metal. The alloys microstructures were analysed with the scanning electron microscopy (SEM). The sample hardness test were conducted by Vickers hardness tester.