Eddy A Basuki et al., J Material Sci Eng 2014, 3:3
http://dx.doi.org/10.4172/2169-0022.S1.014

OMICS Group Conferences
Accelerating Scientific Discovery

3rd International Conference and Exhibition on
Materials Science & Engineering
October 06-08, 2014 Hilton San Antonio Airport, USA

Interdiffusion and phase stability of aluminide coated Ti-Al-Cr-Nb-Zr-Y alloys at high temperatures

Eddy A Basuki[1], **DjokoH Prajitno**[2] and **Fadhli Mohammad**[1]
[1]Institute of Technology Bandung, Indonesia
[2]Nuclear Technology Center for Materials and Radiometry, National Atomic Agency, Indonesia

Intermetallic alloys of the Ti-Al system have combination of properties suitable as the candidates for the replacement of nickel based superalloys. Nevertheless, at high temperatures applications, such as turbine blades of aircraft engines, these alloy system still face some problems. The oxidation resistance for such applications requires high aluminum content, but this increases the brittleness of the alloy. Reducing the aluminum content to formα2-Ti_3Al/γ-TiAl intermetallic alloys has been recognized as one of the solutions for this problem. To increase the oxidation resistance of the two phase α_2-Ti_3Al/γ-TiAl intermetallic alloy, coatings of higher aluminum contents materials are normally used, one of which is by using a diffusion aluminide coating having layers of $TiAl_3$ and $TiAl_2$ based intermetallic compounds. This alloy-coating system is essentially metastable, consequently during application at high temperatures interdiffusion and microstructural changes can occur. The extent to which these microstructural changes occur is strongly dependent on temperature and time. In this study, pack aluminizing method has been used to develop aluminide coatings on Ti-Al-Cr-Nb alloys doped with zirconium and yttrium. This study reports the phase transformations that induces the microstructural changes resulted from the overheating of this high-activity aluminide coated Zr-Y doped α2-Ti_3Al/γ-Ti-Al-Cr-Nb intermetallic alloy. The overheating condition was simulated by isothermal heating at 800°C, 900°C, and 1000°C for various times. The experiment results showed that phase transformations resulting from interdiffusion between coating and substrate are complex and the effects of Zr and Y in increasing the stability of the coatings are revealed.

Biography

Eddy A Basuki has completed his Doctor of Philosophy (PhD) at School of Materials Science and Engineering, The University of New South Wales, Australia, in 1998. He is one of the Associate Professor in the Department of Metallurgical Engineering and act as the Vice Dean of Faculty of Mining and Petroleum Engineering, Bandung Institute of Technology, Indonesia. He has published more than 40 papers in journals and proceedings of national and Iinternational seminars.

basuki@mining.itb.ac.id