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Phase Transformation in AlTiNbVW High Entropy alloy

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High entropy alloys (HEAs), which comprise more than five principal elements, are presently of great interest in materials science and engineering. A predication by CALPHAD has been performed in a new AlTiNbVW HEA, which shows that this alloy consists of two similar bcc phases in the as-cast condition. Current work is to study the phase composition in this multicomponent alloy system at equiatomic condition using neutron/synchrotron diffraction under heat treatment. The chemical composition and microstructure of these two bcc phases has been determined using Energy Dispersive X-Ray Analysis (EDX) and Backscattered-Electron (BSE) Imaging. A diffusion controlled phase transformation between these two bcc phases has been found to take place between 1000°C and 1700°C. The phase transformations kinetic of this bcc1 to bcc2 transformation has been studied systematically using in-situ neutron/synchrotron diffraction with combination of a dilatometer.

Primary author: LI, Xiaohu (FRM2, Physik, TU München)

Co-authors: Ms TING, Yinying (Physik Department, Technische Universität München (TUM), 85748 Garching, Germany); GAN, Weimin (Helmholtz-Zentrum Geesthacht); HOFMANN, Michael; Mr LIANG, Zhida (Institute of Materials Research, Helmholtz-Zentrum Geesthacht, Max-Planck-Str. 1, 21502 Geesthacht, Germany); HOELZEL, Markus

Presenter: LI, Xiaohu (FRM2, Physik, TU München)

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