



VIRTUAL SEMINAR

Thursday, 25.03.2021 at 13:00

On the precipitation of micro-phase in the AlCoCrFeNi_{2.1} EHEA and its effects on mechanical properties

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In the present study, the precipitation of micro-phase by ageing the AlCoCrFeNi_{2.1} eutectic high-entropy alloy (EHEA) at 800 °C and its effect on mechanical behavior of the alloy was elaborated. The alloy at the as-cast state consists of B2 (BCC) and L₁₂ (FCC) lamellar phases at a volume ratio of 0.3/0.7. From the supersaturated L₁₂ phase, by ageing at a constant temperature of 800 °C up to 500 hours, a micro-phase with a B2-like structure precipitates and grows to an equivalent circle diameter of $0.42 \pm 0.1 \mu\text{m}$; by further ageing (in our case up to 1000 h) the precipitates coarsen according to the Ostwald ripening mechanism [1]. Nanoindentation measurements were performed in order to evaluate the local mechanical behavior of two different phases with different chemistry, structure, and lattice orientations. It was found that after 20 h of ageing at 800 °C, where the B2-like microphase already precipitated, the microstructure is still in a metastable condition with high scatter of hardness values and lattice distortion. After 100 h of ageing, the number and size of precipitates in the L₁₂ phase increase and the microstructure reaches a fairly stable condition, where there is almost no scatter of lattice misorientation and chemical composition, but still a fairly high scatter in hardness levels, due to the presence of precipitates. In general, the B2 phase has a higher hardness when compared to the L₁₂ phase.

1. Kafexhiu, F.; Podgornik, B.; Feizpour, D. Tribological Behavior of As-Cast and Aged AlCoCrFeNi_{2.1} CCA. *Metals* **2020**, *10*, 208, doi:10.3390/met10020208.

Kindly invited.