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Radiotracer studies of diffusion in multi-principal element alloys

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Single-phase multi-principal element alloys, termed as high-entropy alloys (HEAs), are in focus of an intensive research now, both for fundamental understanding and technological applictions. A "sluggish"diffusion concept [1] helped to boost an interest from many diffusion groups and to improve our knowledge on diffusion in the multicomponent alloys. In the overview, the current state-of-the-art of diffusion research in the multi-principal element alloys is presented. Whereas tracer diffusion might be considered as sluggish when the diffusion rates in FCC CoCrFeNi and CoCrFeMnNi HEAs are analysed [2-4], the concept becomes ambiguous when the element diffusivities in the FCC $Ni_x(CoCrFeMn)_{1-x}$ alloys are considered [5]. In HCP AlHfScTiZr HEAs, Zr diffusion is recently found [6] to be even enhanced with respect to that in pure α-Zr even when considered at the same homologous temperatures. The origin of such behaviour is analysed. The importance of diffusion measurements using the ISOLDE facilities is highlighted.

References

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Primary author: DIVINSKI, Sergiy (Institute of Materials Physics, University of Münster)

Presenter: DIVINSKI, Sergiy (Institute of Materials Physics, University of Münster)

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