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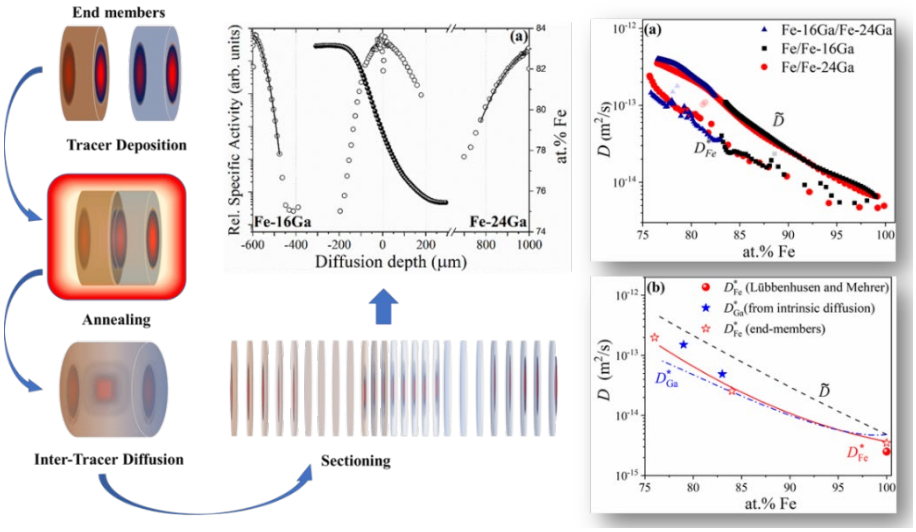
Topic: Diffusion in metals and alloys, Grain boundary segregation and Grain boundary diffusion, Thermodynamics and kinetics, Phase transformations in materials, B2 aluminides, High entropy alloys, Functional materials

Our research is mainly focused on understanding the diffusion behaviour in various technological as well as advanced materials using radio tracer diffusion techniques and on the development and application of new methods to fast track the diffusion measurements in materials.

We recently demonstrated an ultimate proof of the high potential of a novel tracer-interdiffusion couple technique to generate reliable and reproducible mobility data in the alloys with a strong composition dependence of the diffusion coefficients. Both tracer- and inter-diffusion can be simultaneously measure using this technique. The influence of molar volume can be evaluated.



Using this experimental method (shown in Figure) one can estimate the tracer diffusion coefficients of inaccessible component via experimental determination of the ratio of the tracer diffusivities at the Kirkendall marker planes and utilizing the known tracer diffusion coefficients measured directly by the radiotracer method. This method can be followed even in the absence of reliable thermodynamic details.

Currently we are actively working on the investigation of diffusion in HCP medium entropy, solute segregations in the high entropy alloys, Influence of chemical order on the diffusion properties of FeGa alloys. We are also working towards the development of self-tuned functional devices applying the principles of diffusion.

Selected publications:

1. Muralikrishna, G. M., et al. "Composition dependence of tracer diffusion coefficients in Fe–Ga alloys: A case

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study by a tracer-diffusion couple method." *Acta Materialia* 203 (2021): 116446.

2. Muralikrishna, G. Mohan, et al. "Atomic transport in B2-ordered Al (Fe, Ni) alloys: Tracer-interdiffusion couple approach." *Intermetallics* 126 (2020): 106920.
3. Alphonse, Carmel Mary Esther, et al. "Interface-Driven Thermoelectric Switching Performance of VO+-Diffused Soda-Lime Glass." *physica status solidi (RRL)–Rapid Research Letters* (2021): 2100077.
4. Muralikrishna, G. M., et al. "Tracer diffusion in ordered pseudo-binary multicomponent aluminides." *Scripta Materialia* 178 (2020): 227-231.