

EXMONAN

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Atomistic methods in diffusion studies

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A great challenge for the material science is the continuous quest of advanced materials with properties that satisfy increasing demands of evolving technology. Some promising candidates are currently glasses and high entropy materials. Fast ionic conductors, like alkali borates or silicates, have attracted growing interest in recent years as candidates for future battery and energy storage applications. With their ability to incorporate a wide range of different elements, they are also an ideal material to study fast atomic motion mechanisms of ions in glasses [1]. High entropy or properly complex, concentrated alloys (CCAs) have emerged as a promising class of multicomponent alloys which gather various curious properties and awaken great interest among others in high temperature applications.

To study dynamics in these materials we applied a new method enabled by the advent of modern synchrotron sources: atomic-scale X-ray photon correlation spectroscopy (aXPCS) is an extension of dynamic light scattering in the X-ray regime, detects temporal intensity fluctuations of coherent speckles and provides information on sample dynamics at atomic length scales [2].

This talk will give an overview about dynamics studies on ionic glasses and on CCAs. Recently identified effect of the synchrotron beam-induced dynamics in oxide glasses will be discussed. This effect can open new, interesting possibility for studying samples with otherwise 'sluggish' mobility.

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[1] M. Ross, M. Stana, M. Leitner and B. Sepiol, *New Journal of Physics* 16, 093042 (2014).

[2] M. Leitner, B. Sepiol, L.-M. Stadler, B. Pfau and G. Vogl, *Nature Mat.* 8, 717 (2009).