DyProSo 2015



Contribution ID: 50

Type: Talk

Polarized Raman Spectra of Perovskite Relaxor Ferroelectrics

Tuesday 15 September 2015 14:35 (25 minutes)

Pseudo-binary solid solutions of perovskites ferroelectrics are often showing either a ferroelectric transitions with a glassy dynamics or enhanced piezoelectric properties. Because of the demonstrated application potential of (1-x)Pb(Zn1/3Nb2/3)O3-xPbTiO3 and related materials, considerable research efforts are still payed to the understanding these phenomena.

The IR spectroscopy of such lead-based perovskites is relatively well understood[1], but the assignment of Raman spectra remains a rather difficult task. The Raman activity seems to originate from both the occupational ordering [2] and the ionic off-centering [3]. The weight of these effects is varying from one material to another. Morever, the inherent disorder seems to lift the strict Raman selection rules. Interestingly, the polarized Hyper-Raman scattering spectra obey the standard polarization selection rules rather well [4,5] Nevertheless, Raman scattering in relaxors shows a measurable polarization dependence and it has been argued that specific features of polarised Raman scattering can be even employed for example to probe relaxor to ferroelectric crossover [6] or to distinguish between distinct ferroelectric phases coexisting in materials with compostion close to the so-called MPB boundaries[7].

Here we shall present our recent polarized Raman scattering studies of relaxors. In the spirit of Dyproso symposium, we shall go through the basic concepts, challenges and unpublished results.

- 1. JH et al, Phase Transitions, 79, 41 (2006).
- 2. Setter N and Laulicht I, Appl. Spectrosc., 41, 526 (1987).
- 3. Iwata M, et al, Jpn. J. Appl. Phys., 40, 5819 (2001).
- 4. A. Al-Zein, et al, Phys. Rev. B, 78, 134113 (2008).
- 5. A. Al-Zein et al, , Phys. Rev. Lett. 105, 017601(2010).
- 6. Maier B et al, Phys. Rev. B, 79, 224108 (2009).
- 7. I. Rafalovskyi, et al, arXiv:1304.1879 (2013).

 Author:
 Dr HLINKA, Jiri (Institute of Physics AS CR)

 Presenter:
 Dr HLINKA, Jiri (Institute of Physics AS CR)

Session Classification: Theoretical and experimental methods

Track Classification: DyProSo2015 Main track