

Supervisor's report on the doctoral thesis of Iegor Rafalovskyi, entitled :  
**„Lead-based relaxor ferroelectrics by Raman scattering“**  
(Posudek školitele na disertační práci)

Mgr. Iegor Rafalovskyi graduated from the Taras Shevchenko National University of Kyiv in 2010. In autumn 2010 he started his Ph.D. studies at the Charles University. His thesis research has been realized at the Department of Dielectrics of the Institute of Physics of the Czech Academy of Sciences in Prague. The subject of his thesis required to get familiar with the details of solid-state Raman scattering spectroscopy and with the problematics of lead-based perovskite relaxor ferroelectrics. It is my pleasure to state that Mgr. Iegor Rafalovskyi acquired solid level of competences in both these fields and that the Raman scattering results listed in this thesis represent a valuable original contribution to the relaxor science.

Mgr. Iegor Rafalovskyi was in contact with several colleagues of mine and in particular, he had a great chance to learn delicate aspects of Raman spectroscopy instrumentation directly from one of the best Czech experts in the field, Dr. Ivan Gregora. He learned very quickly all practical aspects of his work but when some theoretical approach attracted his interest, he was also ready to pursue the problem by his own, even make some analytic calculation or a little computer program, as for example when he explored the mechanically compatible interfaces or the options of singular value decomposition algorithm. But the most characteristic was his technical curiosity and talent, manifested in his efforts to improve our experimental set up. Perhaps, this is what distinguished Mgr. Iegor Rafalovskyi from most of his peers: rather than to simply use the spectrometer and to fit the spectra, he would spent his time at the opened spectrometer, with some electronic schema or technical drawings for the mechanical workshop, or searching for the available electronic and optic components - trying to find out how to make the experiment better and more convincing. Such a truly experimental approach was often rewarded by unusual results. For example, the new experimental set up allowing right-angle scattering Raman microscopy yielded the missing Raman tensor components of PMN-PT crystals.

The physics of relaxor phenomena is a difficult subject, highly debated in the scientific community, and the interpretation of Raman scattering in relaxors will continue to pose challenging problems even after this thesis. Nevertheless, I can say that Mgr. Iegor Rafalovskyi in his thesis did brought a major contribution to the clarification of Raman spectra of relaxors and that he demonstrated abilities to perform independent scientific research. **In summary, it is my pleasure to recommend the thesis of Mgr. Iegor Rafalovskyi to be defended in front of the respected committee. I am convinced that the candidate deserves the Ph.D. degree.**

Prague, 9th August 2017

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