



The Henryk Niewodniczański  
INSTITUTE OF NUCLEAR PHYSICS  
POLISH ACADEMY OF SCIENCES

Prof. Maria Bałanda

Kraków, 16 August 2016

Professor Yasuhiro Nakazawa  
Director of Research Center for Structural Thermodynamics  
Graduate School of Science, Osaka University  
Toyonaka, Osaka 560-0043

Dear Professor Yasuhiro Nakazawa,

already several weeks passed since I came back from my stay at the Osaka University. These two and half months starting from 15th March up to the end of May have been a wonderful and an unforgettable time for me. I have never been to Japan before and, on the other hand, I wanted to spend some time working with the scientists from your world famous calorimetry centre, where so many interesting and important studies were performed. In this letter I would like to thank you very much for the invitation and for all you have done to arrange so well my visit to the Osaka University.

The scientific contacts of the Division of Condensed Matter Physics from my home institute with the Graduate School of Science Osaka University started ten-odd years ago thanks to Prof. Michio Sorai. A number of papers in Japanese-Polish collaboration on the properties of molecular materials were published. Among them there are also common works on molecule-based magnets. The validity of thermodynamic research on this type of the novel materials has been very well shown in the extensive and valuable review Calorimetric Investigation of Phase Transitions Occurring in Molecule-Based Magnets first published in 2006 and then updated in 2013 by Michio Sorai, Motohiro Nakano, Yuji Miyazaki and you. During my stay I had a chance to get acquainted to the rich and advanced equipment used in the Research Center and in the Department of Chemistry. Designed and constructed in Osaka calorimeters of different types, possibility of heat capacity measurements down to subkelvin temperatures in magnetic field and in applied pressure, enable research into the most exotic phenomena and materials. The own liquid helium liquefier in the Toyonaka Campus is necessary, indeed. I was very much impressed by the high level of the lectures presented by the RCST team during the Half-Day Symposium, like that on angle resolved magnetic heat capacity in organic superconductors by Mr. Shusaku Imajo, on thermodynamics of organic spin liquids by Dr. Satoshi Yamashita, or spectroscopy and calorimetry of lithium ion in fullerene by Dr. Hal Suzuki. The results on transitions in the doped organic Mott insulator as well as those on glassy state in (BEDT-TTF)<sub>2</sub>X salts which were presented by you were also very interesting. Finally, it was a real surprise for me, that the famous double-decker terbium phthalocyanine Single Molecule Magnet has been first obtained in Osaka by Prof. Naoto Ishikawa. His talk explaining what makes this complex a SMM was an example of the perfect academic lecture.

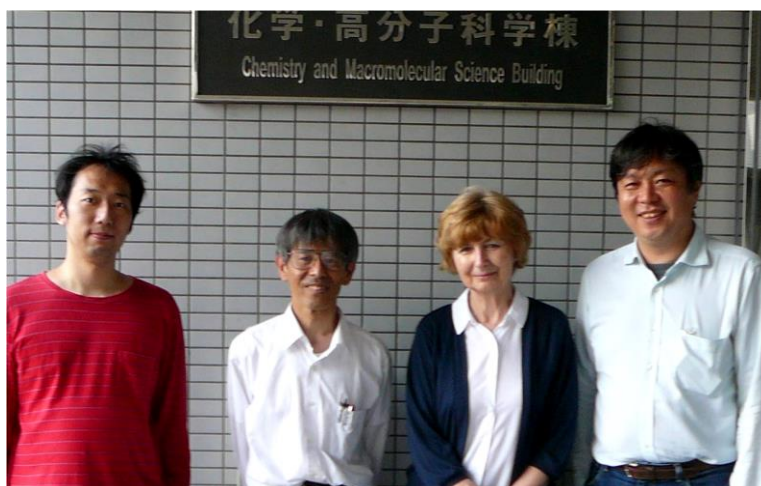
Me and my colleagues from the Department of Magnetic Research, we are grateful for the possibility of the in field and under pressure calorimetric measurements for the octacyanometallate samples, Mn<sub>2</sub>-bpy-Nb(CN)<sub>8</sub> with a chain structure and Co<sub>2</sub>-pirazole- Nb(CN)<sub>8</sub>, both of T<sub>c</sub> = 5.3 K, synthesized in Kraków. We appreciate already the heat capacity data in the external field for the cobalt sample obtained by Dr. Satoshi Yamashita and the preliminary results obtained in the home-made pressure cell by you and by Mr. Kuninori Oishi. We are sure that the results for the manganese sample delivered by Prof. Yuji Miyazaki will be as usual of the highest precision. We thank very much every one for the experimental work and for all other efforts. Moreover, I would like to thank you, Prof. Motohiro Nakano, Prof. Michio Sorai, Prof. Hiroki Akutsu, and Dr. Hal Suzuki for all talks and discussions, also for that on low dimensional molecular magnets after my seminar. The time spent in



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your Department was very efficient for me from the scientific point of view, I was also grateful I could continue some work related to my home institution.

I found the structure of the Osaka University quite remarkable and advanced, as it includes many specialized institutes besides the interdisciplinary units. Thanks to the kindness of Prof. Michio Sorai I have seen also the Suita Campus, housing other faculties and the separate Low Temperature Center. I was really impressed not only by the high level of research and education in Japan, but also by the organization of life, perfect transportation, clean air and care for environment, and a magnificent modern architecture of Umeda (against the threat of earth quakes). I realize that all this, the Japanese people achieved by hard work, patience and diligence. Besides the modern aspects of living, I had a chance to learn some details of the Japan rich history and culture, to see beautiful old temples and shrines, to walk through the true Japanese gardens and to admire lovely pieces of craft or fine arts. Thanks to Dr. Yamashita I could see Horyu-ji, Nara and Uji. I visited many great places in Kyoto, traveled to Kobe and mount Roko, have been to the charming Minoh park, and could enjoy the wonderful *Sakura* during the *Hanami* festive days. It was a pleasure for me that some of the touristic impressions I could share with my two daughters, who came to Japan for a fortnight. They liked also the party after the Half-day Symposium, where they could meet and talk with people of your group.



May 2016: Dr. Satoshi Yamashita, Prof. Yasuhiro Nakazawa, Prof. Maria Balanda, Prof. Hiroki Akutsu.

In the last words of this letter I would like to express my sincere thanks to you for inviting me to the Osaka University, for all the arrangements, help and kindness, as well as for the scientific cooperation. I do hope that our common research will result in the acceptance of the Joint Project "*Comprehensive investigation of new functional materials*" under the agreement between Polish Academy of Sciences and Japan Society for the Promotion of Science. I thank very much Prof. Yuji Miyazaki and Dr. Satoshi Yamashita for carrying-out laborious experiments. I am extremely grateful to Prof. Michio Sorai and his wife Noriko for their exceptional care, friendship and hospitality I have experienced during my stay. Finally, I thank Prof. Hiroki Akutsu, with whom I shared the room, for his everyday smile, constant willingness to help me and for interesting discussions on the intricacies of Polish and Japanese history.

I wish all of you further success, lots of joy on the research, great discoveries and happiness.

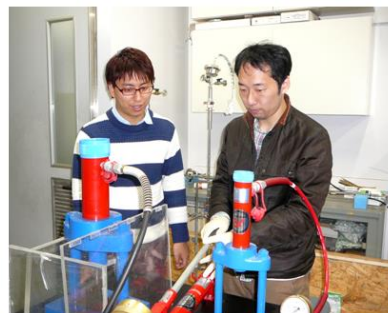
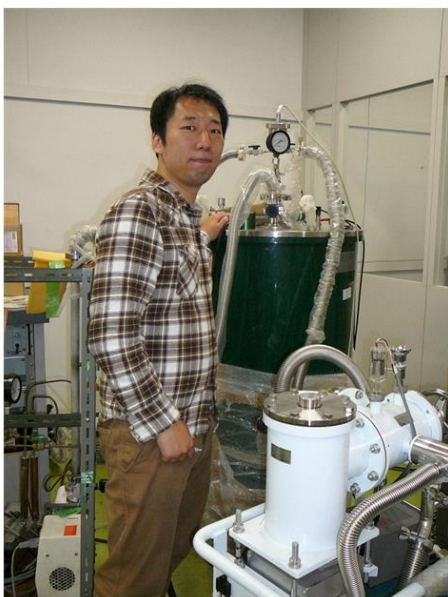
With sincere thanks and regards -

*Maria Balanda*



**Prof. Yuji Miyazaki by PPMS.**

**Prof. Hiroki Akutsu with the student by MPMS.**



**Dr. Satoshi Yamashita operating the experiment.**

**Preparing the sample for the calorimeter.**



**At the party in the Shiomu memorial room**