

§13. Study of Methods of Scientific and Industrial Application of Atomic and Molecular Data

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Recent fast, significant and remarkable advancement we have witnessed in past decades in areas such as high-tech. industries, medical research, environmental science, atmospheric science, fusion sciences as well as other basic sciences including astrophysics and radiation physics and chemistry fully depend on extensive utilization of atomic and molecular (A&M) data for structures basic understanding of various phenomena, but also establishing guiding new key principles and basic technologies based on simulations with this accurate and complete A&M data basis. Without this A&M data basis, such an impressive progress of our technologies and basic understanding of nature would not have been realized.

We undertook this collaborative effort to establish the forum as a platform connecting between A&M data producers and data users to integrate independent and isolated effort of data production and storage so that more efficient and complete data production and transmission could be possible.

In the present research project, we established a non-profit organization (NPO), named “The Forum for the Atomic and Molecular Data And Their Applications”. Summarizing the results of discussions since 2004, we made the documents of the certificate of incorporation and the business scheme, and finally, the certification of the forum was obtained on 13-Apr-2010 from the Gifu Prefectural government. The objectives of the forum is determined to be (1) the establishment of a community of producers of atomic and molecular data and users, (2) promotion of use of data in various fields from basic science to industrial applications, (3) establishment of a system to support operation of the data base. Matching between data producers in universities and national laboratories, and users in private companies are realized by organizing conferences and seminars are determined to be the main activity of the forum. The

matching will also be realized through the internet activities. We operate a mailing list, using the Google Groups. Furthermore, we have obtained the internet domain of “am-data-foram.com”, and opened a web site as shown in Fig.1.

Presently, the forum has 24 regular members and the total number of 42 internet members who receive e-mail messages from the forum, and one company support member, with Dr. Izumi Murakami as the chief director.

We held a seminar on 2 to 4-Feb-2011, with an aid for the collaboration for meetings from NIFS titled, “Application of AM (atomic and molecular) data and AM model” and also “Frontiers of Research on Plasma Spectroscopy and Atomic-Molecular-Radiative Processes”. During the seminar, atomic processes in atmospheric plasmas, which are interested mainly in environment sciences, as well as heavy particle collisions in plasma processes are discussed.

We also discussed on starting a working group for modeling plasma processing. A meeting was held on 28-Jan-2011 and the result was reported on the seminar. It is realized that still some of key atomic data for the plasma processing are not available, so that formulas for estimating unknown rate coefficients will be interesting. It is also realized that needs of the atomic data are significantly different between universities and companies. It is found that efforts to establish collaborations between universities and companies should be continued. In addition, many of the members of collaboration also contributed to the publication of the handbook of the atomic and molecular data edited by Prof. T. Hamaguchi of Osaka Univ. et al.



(fig.1) Top page of the web site of the A&M data forum.

During discussions in working group meetings and seminar, it is also realized that for the efficient matching between data producers and users, each member should continue efforts to open information on their research and development, and the forum should provide appropriate environment of discussions through seminars as well as through the internet activities.