Construction of the Network Database and Future Surface Analysis

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Since 1994, Science and Technology Agency (STA) has started to construct Inter Ministry Computer Network System (IM Net) which connects Tsukuba − Tokyo − Osaka by 6MB digital cables. On this network system, STA intends to incorporate databases, one of which is Surface Analysis Database.

When we construct a spectral database by collecting spectral data from different machines, the spectral data format of the data capture computer must be translated to a common format, and intensity and energy scales must be converted to standard scales.

The format of spectra sent by the participants should be the VAMAS−SCA Standard Data Transfer Format (VAMAS format) with the additional information packages. The structure of the VAMAS Format is suitable for communication. Data storage for manipulation is quite separate matter from data communication. Therefore, information from the VAMAS Format is not enough to handle the data in the data bases. However, we believe the future compatibility is essential. New systems should be able to read from old and vise versa.

In the ISO/TC201 activities, we propose four formats encoding information packages for (1) sample information, (2) calibration information, (3) data processing information and (4) other information comprising those items we have not thought about which we will with time consider important.

In 1990, the Japanese contingent working within VAMAS framework started to program software in Visual Basic for the IBM−PC or NEC−PC with Windows to translate spectral data acquired on different machines to VAMAS format and to process AES and XPS spectra in a standard manner. This software has been named the Common Data Processing System. The Common Data Processing System is unique software in which the main aim is focused not on data analysis of an individual spectrum but on tools which enable us to share spectral data.

The software includes standard spectra which are used to evaluate the characteristics of one's spectrometer. It also includes the reference spectra database and physical property database such as a backscattering factor and an inelastic mean−free path. By this software, one can transfer one's original data to a common market.

Surface Analysis Society of Japan is now selecting the specimens for taking spectra for the database. These are metals, ceramics, organic materials and semi-- conductors. After selecting specimens, we will distribute them to the participants of this Network Database Project. We intend to collect about 10, 000 spectra in three years.

We are now discussing quality control of spectra sent from the Project participants, and also the procedure to retrieve the spectral data from the database. The spectral and physical property data retrieved from the database will be displayed on Common Data Processing System.

A workstation for the database will be installed in National Research Institute for Metals, and connected to computers by network systems. The spectral data taken on different machines will be sent to this workstation by computer network or modem line, and stored in the spectral database. In the near future, we hope all computers of surface analysis machines will be connected by computer network, and every surface analyst can use the surface analysis database and common data processing software to identify the surface properties.