

## **New Applications of HVEM and its Related Instruments to Science**

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Recent development of electron microscope such as HETEM, HVEM, FE-TEM (SEM) for microstructural observation, and EELS, EDS, HAAD-STEM etc for micro-chemical analysis are making remarkable progress so that they are greatly contributing not only to materials but also to biological, physical sciences and other fields. In the words, these research fields have rapidly developed with development of performance and analytical functions of electron microscopes. Thus, these electron microscopes are very important techniques for studies for materials science, life science and for industries.

The high voltage electron microscope (HVEM) in these various kinds of microscopes is widely contributing to materials science through in-situ observation of thicker specimens reactions processes and defects behavior under electron irradiation with high resolution, and also being expected to be applied actively to research fields of biology, medicine etc.

Recent another trends of electron microscope usage are to use by connecting other facilities, and to operate or observe via Internet with real time by remote control system.

An example of these systems is connection of ion accelerations to HVEM. This system is very available to study dynamically and with atomic scale on the effects and phase transformation during implantation and so on. Therefore the new system of HVEM is being expected to clarify the basic behaviors in solid and liquid, and also mechanism to develop or to make new advanced materials. And also by using HVEM for the biological study it is possible to observe the fine structure with 3D.

Thus, the roles of electron microscope and the related instruments are becoming important more and more. In this paper some results obtained by new HVEM system will be presented.