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**General rules for scanning electron
microscopy**

ICS 37.020

Descriptors : electron microscopes, microscopes, electron tubes, testing

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Foreword

This translation has been made based on the original Japanese Industrial Standard established by the Minister of International Trade and Industry through deliberations at Japanese Industrial Standards Committee in accordance with the Industrial Standardization Law:

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In the event of any doubts arising as to the contents,
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General rules for scanning electron microscopy

1 Scope This Japanese Industrial Standard specifies general matters which are needed when the morphological observation and analysis of micro spot on specimen surface are carried out mainly owing to the secondary electrons using a scanning electron microscope.

Remarks: The following standard is Normative reference to this Standard.

JIS K 0050 *General rules for chemical analysis*

2 Matters in common The matters in common shall follow **JIS K 0050**.

3 Definitions The definitions of main terms used in this Standard are as follows.

- (1) **scanning electron microscope: SEM** Owing to the scanning two-dimensionally on specimen surface by sharply focused electron probe, the microscope whose fundamental function is shaping enlarged image using secondary electrons obtained from the specimen.
- (2) **electron probe** Electron beam which is the primary electrons emitted from an electron gun unit, then focuses to be a couple of μm to 10 nm or less in diameter by means of lens, and irradiates electrons on the specimen.
- (3) **specimen** The substance which is the target of observation or analysis.
- (4) **emitter** The substance from which electrons are to be emitted.
- (5) **primary electron** The electrons which are emitted from an emitter and to be irradiated on specimen.
- (6) **scattered electron** The electrons scattered forwards or backwards when an electron probe irradiates electrons on specimen.
- (7) **X-rays** Electromagnetic wave in X-rays range (around 0.01 nm to 100 nm) emitted from the specimen when electron probe irradiates electrons on specimen.
- (8) **electron gun** By which electron beam is emitted.
- (9) **lens** By which the diameter of electron beam is reduced (or enlarged). There are two types of lens, one is using magnetic field, and the other electric field.
- (10) **secondary electron** The electrons which have low kinetic energy level, out of the electrons emitted from specimen when electrons are irradiated on the specimen. Generally, it has 10 eV or less kinetic energy.
- (11) **detector** By which the signal, outputted from specimen when electron probe irradiated electrons on specimen, will be captured.
- (12) **anode** The electrode set against an emitter in order either to accelerate electrons released from the emitter or to drag them out from it.
- (13) **backscattered electron** Among the scattered electrons, the electrons, with high-kinetic energy, which are emitted from specimen and scattered backwards. It has the same level of kinetic energy as that of the electron in an electron probe.
- (14) **cathodoluminescence** Owing to the irradiation by electron probe on specimen, the electromagnetic wave which has such wavelength as ultraviolet, visible, or infrared region, emitted from the specimen.