The basic method and advanced techniques of light microscopy

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Light microscopy is one of fundamental equipment for various research field. Within light microscopy we differentiate between stained and unstained samples influencing the amplitude and the phase of the light waves traversing the sample. Contrasting methods like phase contrast, differential interference contrast, often used in living samples, convert phase shifts into intensity. Staining and fluorescence techniques, like immunofluorescence or the use of fluorescent proteins, are used to make selected structures or proteins visible. Recently, the practical application of fluorescent imaging on light microscopy expand because of the development of a lot of new technologies. It is about 20 years since super-resolution microscopy and nanoscopy arrived on the light microscopy scene, but it already plays an important role, particularly in life sciences - without superseding conventional confocal microscopy. The term super-resolution refers to methods that surpass the so-called diffraction limit. In this session, we introduce the basic method and advanced techniques of light microscopy.

Introduction of variable pressure SEM’s principle and tabletop SEM’s latest application

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Since the scanning electron microscope (SEM) can observe the fine structure of the sample surface at a high magnification in three dimensions, it is utilized as a tool for research development and quality control in various fields. On the other hand, SEM requires observation under high vacuum (~ 10⁻⁴ Pa), so samples containing water and oil required complicated sample preparation. Therefore, we developed variable pressure SEM that can be observed even under the low vacuum. It became possible to observe with sample preparation greatly omitted. Furthermore, based on the concept that SEM can be operated easily, the tabletop SEM that can be installed on a laboratory bench has been developed and used for science classes such as elementary schools and junior high schools. This time, we introduce the variable pressure SEM’s principle and desktop SEM latest application which can be used easily.