

Development of correlative obserbation systems between SEM and various microscopes

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The SEM is used in various fields as a rapid investigation tool for topographical and compositional observations and as an analytical instrument. However, SEM does not provide information of color nor physical properties such as quantitative height, mechanical and electrical properties. The color information is compensated by correlative observation with the optical microscope, and the physical properties and height information can be supplemented with the AFM. In this study, the developments of a correlative observation system with optical microscopy and that with AFM measurement for SEMs and some applications will be reported.

The "Mirror CLEM" system was developed for correlation observation with the optical microscope. In this system, after observing from low up to high magnifications at which the target structure has been clearly confirmed with an optical microscope; acquiring the information of observed position to adjust SEM stage position to observe externally; the same part of the sample is observed with the SEM. Since the stage coordinate of the optical microscope is unnecessary, this system works with any types of microscope from any manufacturers [1]. For correlative observation with the AFM, the "SÆMic" system was developed using an SEM - AFM compatible sample holder. The holder has alignment marks, and by reading the observation position to share among the SEM and AFM, coordinate linkage is established and observation of the same field of view is realized [2].

Figure 1 shows a SEM-AFM correlative imaging of a Directed Self-Assembly Polymer using the "SÆMic" system. Although its fine structure is in size of several tens nanometres, observation in completely the same field of view is achieved and complementary information of the height from the AFM image is available to examine two-dimensional SEM image.

Experimental result of correlative analysis with an optical microscope, SEM, and AFM by using both "Mirror CLEM" and "SÆMic" systems will be introduced.

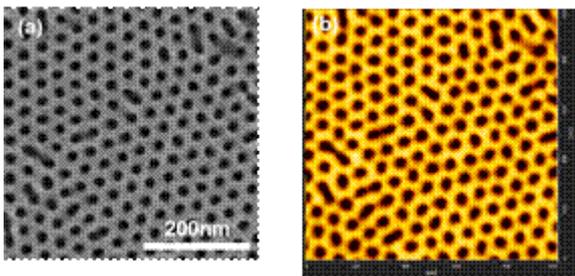


Fig.1 Correlative imaging of Directed Self - Assembly Polymer
aSEM imagebAFM image

[1] Y. Maeda et al., JSM2017, 201, (2017)

[2] M. Dixon et al., Microscience Microscopy Congress 2017, 1009, (2017)