

Study on Fabrication of Small Fluorescence Scale Patterns by Electron Beam Drawing using Fluorescence Materials

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This research examined fabrication of small fluorescence scale patterns by electron beam drawing using polymer film contained fluorescence materials. I formed small fluorescence pattern by irradiating EB in a thin film that was prepared by dispersing fluorescence dye (rhodamine) in PMMA with the aim of fabrication of resolution-evaluation chart and fluorescence scales. The concentration of fluorescence material has been increased and two-lines pattern was fabricated. As a result, a fluorescence scale of high luminance and high contrast was made. For a resolution-evaluation chart, the fluorescence two-lines pattern (a line width of 110 nm and a line interval of 370 nm) with enough fluorescence intensity was fabricated. This result indicates that this two-lines pattern assists to evaluate the resolution of the microscope. Regarding fluorescence scales, I fabricated lattice, wedge and scale patterns that were able to measure sub- μm size. The photobleaching of the fluorescence dye is a problem. I investigated fabrication of fluorescence patterns with little photobleaching by means of semiconductor nanocrystals, which is interested recently as excellent material in light stability. While a uniformity was a problem, fluorescence pattern was fabricated. Advantages of these scales are easy fabrication and handling. These scales are effective in the observation of biomolecules by the fluorescence microscope and in correction of the optical axis of the microscope.