

Laser Micromachining of Submicron Aperture for Electronbeam Microcolumn Application using Piezo Q-Switched Nd:YAG Laser

S.I. Ahn, D.W. Kim, and S.S. Choi,

Department of Physics, Sun Moon University, Ahsan, Chungnam, 336-840 Korea

Experimental studies of laser micromachining on Mo metal using piezo Q-switched Nd:YAG laser have been performed. Miniaturized microcolumn electron gun arrays as a potential electron beam lithography or portable mini-scanning electron microscope application have recently extensively examined. For these purpose, the electro-static electron lens and deflector system called microcolumn has to be assembled. The conventional microcolumn fabrication technique would gave a limitation on the minimization of aberration. The current technique of a 1 μm misalignment would lead to ~ 1.3 nm coma. In order to reduce aberration, assembling the microcolumn component followed by laser drilling should be very beneficial.

In this report, we will address the preliminary report of laser micromachining on Mo substrate using piezo Q-switched Nd:YAG laser. The geometrical figures, such as the diameter and the depth of the drilled aperture are dependent upon the total energy of the laser pulse train, laser pulsewidth, and the diameter of laser beam in addition to the materials-dependent parameters.



Figure 1



Figure 2

Figure 1. The fabricated Mo aperture with 22 μm diameter with pulsed Nd:YAG laser.
Figure 2. The Fabricated Mo aperture with 30 μm diameter with piezo Q-switched Nd:YAG laser. The experiments have been carried out under the same experimental set-up.

연락처: 충남 아산시 탕정면 갈산리 336-840 선문대학교 물리학과 안 승 준
(Tel) 0418-530-2261
(E-mail) sjan@omega.sunmoon.ac.kr