

## ***Ion Beam Lithography by Use of Highly Charged Ar Ion Beam***

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Ion beam lithography (IBL) is a useful technique to fabricate nano-structures. In order to develop this technique furthermore, highly charged ion (HCI) beam was applied to this technique. Higher throughput and unique fabrication are expected caused by high activity of HCIs.

Ar<sup>1+</sup> and Ar<sup>9+</sup> ion beams with E = 90 keV were prepared by a facility built at Kochi University of Technology [1], and irradiated onto spin-on-glass (SOG) through a stencil mask. The facility includes an ECR ion source (NANOCHAN, 10 GHz), a beam transport and analysis system, and an irradiation system. The fluence of Ar ions was monitored during the beam irradiation. The irradiated SOG was etched by a solution of HF for one minute.

The step structure was successfully fabricated on SOG by the chemical etching after the irradiation. The depth of the step structure using Ar<sup>9+</sup> increasing linearly with the fluence of Ar ions and was greater than the depth obtained using Ar<sup>1+</sup> ions as shown in Fig. 1. This result shows the effectiveness of HCI beam for IBL.

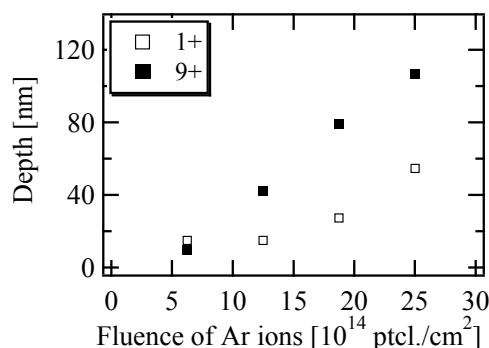


Fig. 1 The depth of the step structure as a function of the fluence of Ar ion

### References

[1] S. Momota et al., Rev. Sci. Instrum. 75, 1497 (2004).