

Summary

- Plasma beam experimental system with HBr gas was established for the investigation of photoresist (PR) surface reaction with Br containing plasma chemistry.
- FT-IR measurement revealed that MAA and/or 2NpMA groups in the PR polymer immediately decreased from the beginning of HBr plasma beam irradiation. These changes could be caused by the chemical effect.
- For the incident angle of plasma beam, 90° , 75° , 60° , 45° , FT-IR spectra were almost identical.
- In-situ XPS showed that the elemental composition of PR surface modified layer was similar to the Ar-beam irradiated one. Br content was around 15% and almost constant after $2 \times 10^{15} \text{ cm}^{-2}$ dose.
- For the incident angle of plasma beam, 90° , 75° , 60° , 45° , elemental composition change was not saturated at $4 \times 10^{15} \text{ cm}^{-2}$ dose for the 60° beam incident and it seems to show the largest change (C decreasing & Br increasing) for further beam dose.
- PR surface roughness was rapidly increased for the ion dose of $4 \times 10^{15} \text{ cm}^{-2}$ and it is necessary to see the roughness change for higher dose irradiation.

2NpMA : naphthylmethacrylate, MAA : methacrylic acid