Additive gas effects in fluorocarbon-based plasma etching chemistry

박재형[1], 장원석[2,1], 유동훈[3,1], 육영근[1], 유혜성[1], 임연호[1,†]
[1]전북대학교; [2]국가핵융합연구소; [3]경원테크
(yeonhoim@jbnu.ac.kr[†])

Recently, plasma etching technology is emerging as one of most significant challenges in next-generation nanodevice due to tight process margin requirement. Various additive gases with main etchant gases are being used in order to meet this requirement. However, process development is still based on engineering experience instead of theoretical estimation due to the inherent complexity of the plasma process. As a part of an effort to address these issues, our group has developed realistic plasma simulation tools with verification by plasma diagnostic data so far. In this work, additive gas effects into main fluorocarbon etching gases were investigated in detail and modeled with plasma physics and chemistry. Plasma density and species were measured by a cut-off probe and a quadrupole mass spectrometer (QMS). Based on our plasma diagnostic data, our plasma models to predict additive gas effects could be verified. We believe that this work can give us better insights for predictable plasma modeling.