

Supplemental

Effect of Vapor-Phase Metal Infiltration on Lithography of PMMA Resist for EUV Applications

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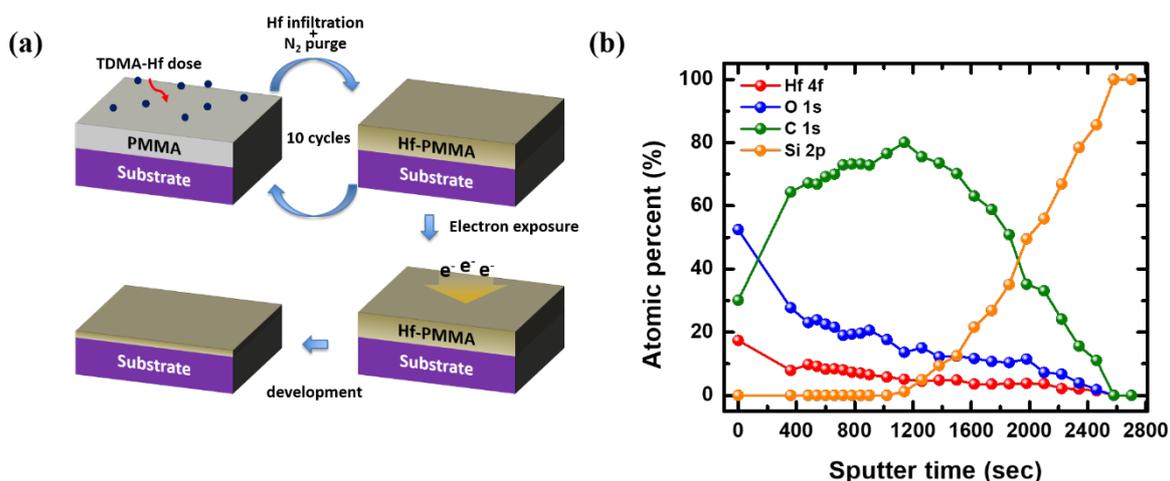


Figure 1. (a) Schematic illustration of photolithography process of PMMA with Hf infiltration. (b) XPS depth profile of Hf infiltrated PMMA using GCIB. The GCIB sputtering condition was set to a beam energy of 5 kV and the cluster size of 2500 atoms. Ar GCIB was sputtered for every 30 s, and the elemental concentrations of Hf, O, C, and Si in Hf infiltrated PMMA were continuously detected until 2800 s of sputter time. As a result, Atomic percent of Hf (red) shows approximately 5 to 10% in PMMA.

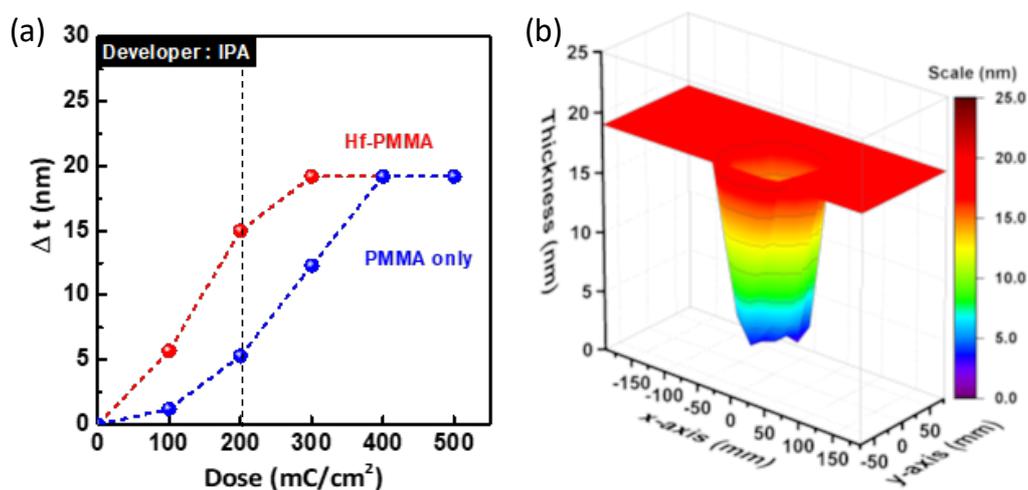


Figure 2. (a) Reduced film thickness after development of Hf-PMMA (red) and PMMA (blue) resists with different electron dosages and (b) 3D contrast map of film thickness after development of Hf-PMMA resist with 200 mC/cm^2 dose.