Figure 4-1  Traditional lithography process for the fabrication of damascene structure.

Figure 4-2  Proposed e-beam lithography process for the fabrication of damascene structure.
Figure 4-3  FTIR spectra of HSQ during traditional thermal baking and furnace curing processes.
Figure 4-4  The (a) cage-like and (b) network-like structures of HSQ.
Figure 4-5  FTIR spectra of HSQ films with different doses of electron beam exposure, ranging from 100 uC/cm² to 700 uC/cm².

Figure 4-6  The leakage current densities of e-beam exposed HSQ films at different doses.
Figure 4-7  Dielectric constant of e-beam exposed HSQ films at different doses.

Figure 4-8  The SEM cross-sectioned profile of collapsed pattern for dense HSQ lines.
Figure 4-9  The possible scenario of pattern collapse for dense HSQ lines.

Figure 4-10  The SEM micrograph of patterned HSQ film with critical dimensions of 60 nm.
Figure 4-11  The comparison of dielectric constants of e-beam exposed HSQ films with different treatment.

Figure 4-12  Leakage current of e-beam exposed HSQ with TMAH development followed by thermal annealing, as compared to typical furnace cured HSQ films.
Figure 4-13  Temperature dependence of moisture desorption from HSQ films with e-beam exposed HSQ followed by TMAH developed and thermal annealed processes and with furnace curing.