

Electrical properties of Al/SiOCH/*p*-Si(100) structure with HMDSO/O₂ precursors deposited by PECVD

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SiOC(-H) films with low dielectric constant have been prepared on *p*-type Si(100) substrates by using plasma enhanced chemical vapor deposition with hexamethyldisiloxane [HMDSO, (CH₃)₃-Si-O-Si-(CH₃)₃] and oxygen precursors. The C-V and I-V characteristics of the Al/SiOC(-H)/*p*-Si(100) structure were studied in the forward and the reverse directions by applying a polarizing potential. The SiOC(-H) thin films are deposited at room temperature and the flow rate ratio of the precursors are varied. The deposition parameters have been optimized in order to obtain the low dielectric constant of SiOC(-H) films. Film thickness and refractive index are measured by field emission scanning electron microscopy and ellipsometry, respectively. The lowest dielectric constant of the SiOCH film was 2.1±0.12 for the film with the flow rate ratio of 85%. The detailed electrical properties of the SiOC(-H) film such as leakage current, break down voltage, trap densities, and so on are presented as a function of the precursors flow rate ratio.