

Characterization of silica xerogel films by variable-angle spectroscopic ellipsometry and infrared spectroscopy

C Himcinschi *et al* 2001 *Semicond. Sci. Technol.* **16** 806-811 doi:10.1088/0268-1242/16/9/312

[C Himcinschi](#)¹, [M Friedrich](#)¹, [C Murray](#)², [I Streiter](#)², [S E Schulz](#)², [T Gessner](#)² and [D R T Zahn](#)¹

¹ Institut für Physik, Technische Universität Chemnitz, D-09107 Chemnitz, Germany

² Zentrum für Mikrotechnologien, Technische Universität Chemnitz, D-09107 Chemnitz, Germany

Abstract. Silica xerogel films with low dielectric constants were prepared using a sol-gel spin coating method. The as-prepared films were further treated by hexamethyldisilazane to achieve the hydrophobization of the pore surfaces, by replacing hydrophilic silanol groups with hydrophobic trimethylsilyl (TMS) groups. The thickness and optical constants of the films were derived from variable-angle spectroscopic ellipsometry measurements. The determined refractive index decreases from 1.271 ± 0.008 to 1.188 ± 0.003 (values at 632.8 nm) while the porosity increases from 40.4 to 58.6% with the process parameters used. The Maxwell-Garnet approximation was used to relate the ellipsometric data to porosity. The IR absorption bands of CH species in TMS groups reveal that the surface area of the pores is larger in the samples with lower porosity.

Print publication: Issue 9 (September 2001)

Received 8 May 2001, in final form 3 July 2001

Published 9 August 2001

[PDF \(194 KB\)](#) | [HTML](#) | [Gzipped PS \(204 KB\)](#) | [References](#) | [Articles citing this article](#)