Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Supercritical CO2/Co-solvents Extraction of Porogen and Surfactant to Obtain JORGE LUBGUBAN, ARNOLD LUBGUBAN, MASLINA OTHMAN, RAJESH SHENDE, SHUBHRA GANGOPADHYAY, Dept. of Electrical Engineering, Univ. of Missouri-Columbia, H-C. KIM COLLABORATION, W. VOLKSEN COLLABORATION, R.D. MILLER COLLABORATION[1] — A method of pore generation by supercritical CO_2 ($SCCO_2$)/co-solvents extraction for the preparation of nanoporous organosilicate thin films for ultralow dielectric constant materials is investigated. A nanohybrid film was prepared from poly (propylene glycol) (PPG) and poly(methylsilsesquioxane) (PMSSQ) whereby the PPG porogen are entrapped within the crosslinked PMSSQ matrix. Another set of thin films was produced by liquid crystal templating whereby non-ionic (polyoxyethylene 10 stearyl ether) (Brij76) and ionic (cetyltrimethylammonium bromide) (CTAB) surfactant were used as sacrificial templates in a tetraethoxy silane (TEOS) and methyltrimethoxy silane (MTMS) based matrix. These two types of films were treated with $SCCO_2$/co-solvents to remove porogen and surfactant templates. As a comparison, porous structures generated by thermal decomposition were also evaluated. It is found that $SCCO_2$/co-solvents treatment produced closely comparable results with thermal decomposition. The results were evident from Fourier Transform Infrared (FT- IR) spectroscopy and optical constants data obtained from variable angle spectroscopic ellipsometry (VASE).

[1]IBM Almaden Research Center, San Jose, California 95120

Shubhra Gangopadhyay
Department of Electrical Engineering,
University of Missouri-Columbia

Date submitted: 01 Dec 2004 Electronic form version 1.4