

TH2B: RF MEMS Switches and Switched Capacitors

Thursday 27 May 2010

Time 10:10 - 11:50

Room: 206AB

Chair: Dimtri Peroulis, *Purdue University*

Co-Chair: Art Morris, *Wispry Inc.*

TH2B-3 **10:50**

Charging Characteristics of Ultra-nano-crystalline Diamond in RF MEMS Capacitive Switches

C. Goldsmith¹, A. Sumant², O. Auciello², J. Carlisle³, H. Zeng³, J.C.M. Hwang⁴, C. Palego⁴, W. Wang⁴, R. Carpick⁶, V. P. Adiga⁵, A. Datta⁵, C. Gudeman⁵, S. O'Brien¹, S. Sampath⁵; ¹MEMtronics Corporation, Plano, United States, ²Argonne National Laboratory, Argonne, United States, ³Advanced Diamond Technologies, Inc., Romeoville, United States, ⁴Innovative Micro Technology, Santa Barbara, United States, ⁵University of Pennsylvania, Philadelphia, United States, ⁶Lehigh University, Bethlehem, United States

Modifications to a standard capacitive MEMS switch process have been made to allow the incorporation of ultra-nano-crystalline diamond as the switch dielectric. The impact on electromechanical performance is minimal. However, these devices exhibit uniquely different charging characteristics, with charging and discharging time constants 5-6 orders of magnitude quicker than conventional materials. This operation opens the possibility of devices which have no adverse effects of dielectric charging and can be operated near-continuously in the actuated state without significant degradation in reliability.