Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Cr Moment Coupling in Cr-containing Diamond-like Carbon Thin Films JUAN COLON, VARSHNI SINGH, VADIM PALSHIN, ANDRE PETUKHOV, YAROSLAV LOSOVYJ, ANDREI SOKOLOV, PETER DOWBEN, IHOR KETSMAN — Structural and magnetic properties of the Cr-doped hydrogenated diamond-like carbon (Cr-DLC) and chromium carbide hydrogenated diamond-like carbon alloy thin films were investigated. Results showed promising magnetic and spintronics application. Diodes were constructed using the silicon substrate as the n-type material and Cr-DLC film as the p-type material for a wide range of Cr concentrations and temperatures. At low chromium content a high capacitance was observed, limiting the properties of the heterojunction device, however, at high Cr concentration, a large coefficient of negative magneto-resistance was observed even at room temperature, suggesting the possibility for a spintronic application. This negative magneto-resistance effect may be related to the coexistence of various material phases including chromium carbide.

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Date submitted: 20 Nov 2008 Electronic form version 1.4