Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Radiation-induced defect formation and reactivity of model TiO2 capping layers with MMA: a comparison with Ru[1] THEODORE E. MADEY, BORIS V. YAKSHINSKIY, M. NEJIB HEDHILI, Physics Dept., Rutgers University, MANISH CHANDHOK, Intel Corp. — Our goal is to provide insights into surface processes that affect the reflectivity of TiO2- and Ru-capped multilayer mirrors used in EUV lithography by 13.5 nm (92 eV) photons. EUV-generated secondary electrons from the substrates cause surface reactions that lead to mirror contamination in background vacuum. In our experiments, low-energy electron beams mimic excitations initiated by EUV radiation. Oxygen vacancies are produced at energies above 25 eV. Carbon accumulation is measured on both Ru and TiO2 surfaces during 20 eV and 100 eV electron bombardment in methyl methacrylate vapor (MMA). The initial rates on the clean surfaces are very different: a C film grows more rapidly on TiO2 than on Ru. However, the limiting growth rates are the same for C thicknesses greater than $\sim$1 to 1.5 nm, when MMA interacts with a C film. Irradiation of the C films in O2 gas has a mitigating effect.

[1]Supported by Intel

Theodore E. Madey
Rutgers University

Date submitted: 23 Nov 2007

Electronic form version 1.4