

Abstract Submitted  
for the GEC10 Meeting of  
The American Physical Society

**The Etch Step in MEMS Deep Silicon Etch**<sup>1</sup> IQBAL SARAF, MATTHEW GOECKNER, LAWRENCE OVERZET, UT Dallas — The etch step of the Bosch process is examined by first forming standard trenches using a Plasma-Therm DSE-II and then etching those for an extended time. The resulting etch profiles are nearly isotropic at the trench mouth but become increasingly anisotropic as the aspect ratio (AR) increases. The sidewall etch near the trench top is largely due to F radicals having a large reaction coefficient; however, few F radicals reach the bottom of the trench. As a consequence, the etch at the bottom can be anisotropic and ion-enhanced without a wall film. Trenches having protected sidewalls (a thick CxFy film) to prevent etching by F radicals at the top also have a distinct AR dependence. While large AR trenches etch at the bottom, low AR trenches do not break through the protective film. In addition, the etch profile at the bottom of the high AR trenches has differing lateral and normal etch components. The normal etch component, driven by ions, is 3-4 times higher than the lateral etch component, which can have a facet dependency. These results indicate that it is more important to protect the top of the trench during the deposition step because anisotropic etching can occur without wall protection at the bottom of high AR trenches.

<sup>1</sup>This research was supported through SRC Award: 2008-KJ-1831.

Iqbal Saraf  
UT Dallas

Date submitted: 11 Jun 2010

Electronic form version 1.4