Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Improving the Adhesion of Au Thin Films Onto PMMA Substrates Using Chloroform COURTNEY WARDWELL, ALAN MO, BRIAN AUGUSTINE, CHRIS HUGHES, THOMAS DEVORE, None, JAMES MADISON UNIVERSITY TEAM — Conventional techniques such as O_2 plasma treatment to improve Au thin film adhesion have resulted in limited success. In this study, the adhesion of 6 nm and 100 nm Au thin films onto 0.8 mm poly(methyl methacrylate) (PMMA) sheets was significantly improved when Au thin film samples were exposed to a saturated chloroform environment after metallization. The shear force required to remove the Au films was calculated by placing samples onto a polisher spinning at 150 rpm and using a spring loaded device to apply the force. Au thin samples were characterized through optical microscopy, atomic force microscopy (AFM) and attenuated total reflectance Fourier transform infrared spectroscopy (ATR-FTIR). AFM and optical images show a roughening of the Au thin films after chloroform exposure. ATR-FTIR spectra indicate that residual chloroform solvent remains on the PMMA. Our research indicates chloroform may improve adhesion by relieving the stresses at the PMMA-Au interface. X-ray photoelectron spectroscopy (XPS) studies on chloroform pre-treated PMMA samples show residual solvent at the surface one-week after exposure. We have attributed this to a Lewis acid-base interaction between chloroform and the PMMA surface. We will report on the XPS data of post treated samples.

Courtney Wardwell
None

Date submitted: 09 Nov 2012 Electronic form version 1.4