that rapid deterioration, and the evolution of "dark-spot" defects, is frequently acknowledged, and generally attributed to damage at the interface between the organic and the low work function metal electrode.

In this paper, we study the lifetime of OLEDs consisting of 200Å of an aromatic diamine and 100Å - 600Å of a metal tris-quinoline, M(QQ), (where M = Al, Ga, In and Sc). We find that in air, devices run at a constant current of 100mA significantly degrade on a timescale of the order of 10s, dependent on the drive voltage. The degradation is typically characterized by 30% increase in drive voltage and a 75% decrease in external quantum efficiency. We have previously shown that conduction in such devices is controlled by trap-limited injection of electrons into the M(QQ) layer. The injection efficiency into devices made from Ga(QQ), appears to be higher than for devices made from Al(QQ), allowing the former devices to be run at lower operating voltage (i.e. higher power efficiency). We examine this effect of device conduction on lifetime.

We also present results from OLEDs operated in Inert atmospheres, showing the effects of the absence of oxygen and water vapor on device lifetime. We demonstrate a packaged OLED, and examine the lifetime of such devices as a function of composition and operating parameters. We also study the effects of "passivating" the devices by overcoating.

4:30 PM, N7

Polymeric electro-optic materials are being vigorously investigated for a number of applications such as optical interconnection, modulation, and switching. They possess a number of favorable properties such as processibility and low dielectric constant. The potential for spin-coating and photolithographic definition of waveguides is an attractive approach for multilevel electronic packaging incorporating optical interconnects. The low dielectric constant has permitted high bandwidth devices to be more easily fabricated. A number of material issues regarding these applications remain, including thermal stability while maintaining low switching voltage.

Typical polymeric electro-optic materials include a polymer host incorporating nonlinear optical chromophores by doping or covalent attachment. The polymer must be processed with an electric field in order to render it electro-optically active. The electric field process aligns the dipolar chromophores in the polymer; however, this alignment is merely quasistable. A number of approaches has been investigated into materials systems which overcome these limitations.

We describe our current research into a new class of photodefintable polyimide polymer hosts which are doped with new thermally stable chromophores. First, we describe our development of low optical propagation loss polymers. Using photothermal deflection spectroscopy along with waveguide loss measurements, we found that optical losses were dominated by extended absorption tails. The photodefintable fluorinated polyimides minimize these losses. We will also describe the processing of these polymers into channel waveguides.

Thursday, June 23, 1994, PM

Session O: Low Temperature Processing and Low Dielectric Constant Materials

Room: UMC, East Ballroom

Session Chairman: Rafael Reif, Microsystems Technology Laboratories, M.I.T., Cambridge, MA 02139
Co-Chairman: Lionel C. Kimmerling, Materials Processing Center, M.I.T., Cambridge, MA 02139

1:30PM, O1
Metal Adsorption on Silicon Surfaces from Wet Wafer Cleaning Solutions: Gerd Norga, Heichem Msaad, Rita Gupta, Jurgen Michel and