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Mechanical deformations of the metal cathodes of polymer light emitting devices during stability tests[1] ZAC BARCIKOWSKI, JACOB COX, MARIAN TZOLOV[2], Department of Physics, Lock Haven University of Pennsylvania — The polymer light emitting devices (PLEDs) include materials with substantially different mechanical properties - oxides as anode, organic polymers as light emitter, and metals as cathode. The typical expectation is that this mix of materials would be a problem if there is an exposure to large temperature variation. Our studies on the stability of the PLEDs give evidence that even without substantial heating of the devices, mechanical deformations appear. They are manifested in delamination and loss of contact area with all associated negative impact on the light emission from the devices. Our optical and scanning electron microscopy images show round shaped cathode deformations with enhanced degradation of the polymer along their periphery. In order to check the hypothesis of build-up of mechanical stress in the metal films during their deposition, we have used thermally evaporated aluminum cathodes with different thickness. We have used anodes different than the traditionally used ITO film in order to verify if an oxygen evolution is responsible for the formation of the mechanical deformations. We will show results on how a buffer layer between the light emitting polymer and the cathode influences the formation of the mechanical deformations.

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