

Tuesday Evening, May 24, 2022

Special Interest Talks

Room Town & Country A - Session SIT2-TuSIT

Special Interest Session II

Moderator: Samir Aouadi, University of North Texas, USA

7:00pm SIT2-TuSIT-1 **Evaluating Electro-Mechanical Reliability using In-Situ Methods**, *Megan J. Cordill (megan.cordill@oeaw.ac.at)*, Erich Schmid Institute of Materials Science, Austrian Academy of Sciences, Leoben, Austria

INVITED

Electrical, mechanical and interfacial properties of thin metal films on compliant polymer substrates are important to understand in order to design reliable flexible electronic devices. Thin films of Cu, Au, and Al on polyimide (PI) substrates were examined for their use as interconnects in flexible electronic devices. Using in-situ tensile straining with atomic force microscopy (AFM), X-ray diffraction (XRD), and confocal laser scanning microscopy (CLSM) mechanical and interfacial behavior can be examined. AFM and CLSM can provide information about crack spacing and film delamination, while XRD experiments are utilized to determine the lattice strains and stresses present in the films. If these in-situ techniques are combined with in-situ 4-point-probe (4PP) resistance measurements, the influence of the mechanical damage on the electrical properties can be correlated. This combination of multiple in-situ investigations are particularly useful when studying the electro-mechanical behavior under cyclic loading conditions where some materials can have an improvement of the electrical conductivity after a few hundred cycles. Mechanisms behind these phenomena as well as methods to measure the adhesion of metal-polymer interfaces found in flexible electronic devices will be discussed.

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