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UTSA Physics and Astronomy



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Thick films of metal and ceramic films are traditionally produced using paste- or ink-based processes that require subsequent high temperature treatments to both remove polymeric additives and to sinter the films to high density. Polymeric or other heat-sensitive substrates are not amenable to such high temperature treatments. Aerosol processes that utilize high speed impaction to produce patterned films offer several advantages over conventional thick film processing routes since they allow room temperature deposition onto almost any substrate material. The Laser Ablation of Microparticle Aerosol (LAMA) process utilizes commodity, micron-sized particles of metals or ceramics that are aerosolized and then ablated to produce 2 – 40 nm nanoparticles. The nanoparticle aerosol is subsequently accelerated to velocities of 300 – 1400 m/sec before impacting the nanoparticles onto a substrate. By rastering the substrate, patterned films with thickness of 1 - 100 μm are produced. In this talk the deformation and film formation mechanisms will be discussed, with particular focus on experimental variables that influence the resulting film nano- and microstructure, including impaction velocity, particle size, and particle orientation.

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