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**A Study of ZnO Thin Film Deposition Using a Modified Electrospray (MES) Technique**[1] DAVID HOOKS, CHRISTOPHER O'LOUGHLIN, THEDA DANIELS-RACE, Louisiana State University — Zinc Oxide (ZnO) is a semiconducting material (II-VI) with a wide bandgap (˜3.4 eV) and high electron mobility that exhibits excellent gas sensing and opto-electronic properties. Depositions of ZnO films typically involve complex chemical synthesis or extensive equipment for physical and chemical vapor deposition. The aforementioned may limit commercial or even laboratory accessibility for thin film and device applications. In this talk, we will discuss our use of a modified electrospray (MES) technique as a method of choice for the deposition of ZnO nanoparticles onto a silicon substrate. Electrospraying requires a syringe and needle, high-power voltage source, and a substrate atop a grounded collector plate. In our custom-designed MES system, we use tunable RPM control of 3-D printed collector plates. For sufficiently large applied voltages (kV range) at the needle tip, the electric field overcomes the surface tension of the ZnO solution and ejects it in the form of a Taylor cone incident to the grounded substrate. Key parameters affecting deposition quality include the distance between the needle tip and substrate, the applied voltage, and the rate at which the solution leaves the syringe. We will evaluate MES film quality with respect to thickness, coverage, and surface uniformity. Successful deposition of ZnO via this robust electrospray system would confirm its utility as alternative to more time and cost intensive methods.

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