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**Atmospheric Stability of Tungsten STM Tips for Atomically Precise Manufacturing (APM)** MAIA BISCHOF, DAVID JAEGER, University of North Texas, JOSHUA BALLARD, JUSTIN ALEXANDER, JOHN RANDALL, Zyvex Labs, RICHARD REIDY, University of North Texas, BRIAN GORMAN, Colorado School of Mines, JIM VON EHR, Zyvex Labs, ATOMICALLY PRECISE MANUFACTURING CONSORTIUM COLLABORATION — In APM, STM tungsten tips are used to selectively remove or add surface atoms to build atomically precise 3D structures. Therefore, the development of stable atomically sharp tips is crucial for long term tip performance and process efficiency. These tips have been shown to be extremely sensitive to electrostatic discharge (ESD) events and some environmental conditions. However, recent work has demonstrated that tungsten tips with three to eight atoms at their apex can be stable structurally and chemically after days of ambient exposure with ESD-safe practices. Whereas macroscale W surfaces will oxidize under atmospheric oxygen, HRTEM and 3-D atom probe measurements confirm that no oxide is formed on these tips with an extremely stable surface structure; however, some oxygen does diffuse into the material. In addition to the description of the chemical and structural characterization employed in this work, several possible explanations for the stability of these tips will be offered.

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