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Convenient and reliable fabrication of high surface quality tungsten electrodes for ion trap ZHAO WANG, Univ of Sci & Tech of China, KARTHIK THADASINA, KIM QIAN, Carmel High School, JI LIU, IUPUI, YUNFENG HUANG, Univ of Sci & Tech of China, LE LUO, IUPUI, UNIV OF SCI & TECH OF CHINA TEAM, IUPUI COLLABORATION, CARMEL HIGH SCHOOL COLLABORATION — We present a new electrochemical etching method for mass-production of tungsten tips as ion trap electrodes, which can also be employed for fabricating nanoscale probes and fiber micro-lens for Atomic Force Microscopy (AFM), Scanning Tunneling Microscopy (STM) and Microelectromechanical Systems (MEMS). Using inexpensive, convenient material and equipment in the process, a simple procedure yields sharp, uniformly shaped and robust tips. Furthermore, the shape and size are tweaked by selecting appropriate electrolyte solution concentration and voltage to produce tips with arbitrary shape. We also explore optimal parameters to create consistent tungsten tips for Ion-Trap experiments. This technique paves the way for the mass-production of ion trap based quantum computer systems.

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