Measurement of kinetic and potential energy deposition in highly charged ion collisions with surfaces R.E. LAKE, NIST and Clemson University, J.M. POMEROY, NIST, C.E. SOSOLIK, Clemson University — We measure craters in thin dielectric films formed by highly charged Xe$^{Q+}$ ($26 \leq Q \leq 44$) projectiles [1]. Tunnel junction devices with ion-irradiated barriers were used to amplify the effect of charge-dependent cratering through the exponential dependence of tunneling conductance on barrier thickness. Electrical conductance of a crater $\sigma_c(Q)$ increased by 4 orders of magnitude ($7.9 \times 10^{-4} \mu S$ to 6.1 $\mu S$) as $Q$ increased, corresponding to crater depths ranging from 2 to 11 Å. By employing a heated spike model, we determine that the energy required to produce the craters spans from 8 to 25 keV over the investigated charge states where kinetic energies were $(8 \times Q)$ keV. We partition crater formation energy into potential and kinetic contributions to find that at least $(27 \pm 2)$ % of the available ion potential energy is required. Decreasing projectile kinetic energy at constant $Q$, provides a new test for charge-dependent kinetic energy loss theory.