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Fabrication of Small AFM cantilever with electron beam induced carbon-tip

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The smaller cantilever probes are fabricated, the better performance such as less noise, higher resonant frequencies and fast imaging can be gotten. Also, accuracy of data and resultant image is limited by the tip geometry, so a cantilever with sharp probe can get doubled performance. With these points, we grew the carbon tips on the rectangular shape of tipless Si_3N_4 cantilevers whose width and length are equally $10\mu\text{m}$.

To get the carbon-based tip, we used electron beam induced deposition method, rather than attachment of carbon nanotube. Contrast to the latter this method threw open the door to grow it on rectangular shaped cantilever without reference to dimension and geometry. Especially, to use the carbon based tip as a tip on an AFM cantilever, it is the key to control length and diameter include the reproducibility of it. In this case, the control parameters are exposure time, acceleration voltage working distance and beam probe current. After the fabrication of them in the most suitable condition, we will operated it with conventional AFM equipment to characterize it.