

## Hydrogen assisted growth of Single-walled Carbon nanotube AFM Tips

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We introduced a hydrogen assisted CVD growth method for high efficiently fabricating SWNT SPM tips. A very thin film of Co was used as catalyst while no patterning process was needed. Through controlling the amount of the bypassing hydrogen to the CVD system and catalysis, we narrowed down the density of SWNTs to ensure a single nanotube at the apex of the probe while avoiding overpopulation of the probe surface with too many nanotubes. SWNT shortening process is also explored to control the length of the SWNT on the tip apex for different applications. We reproducibly achieve 90% or higher yield of nanotube tips.

