

FIB Based Microfabrication Technique For A Novel Type of Scanning Electrochemical Microscopy Probes

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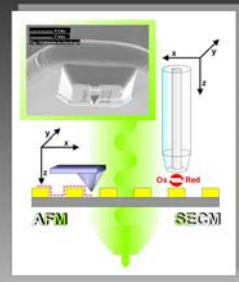
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Merging the Technologies






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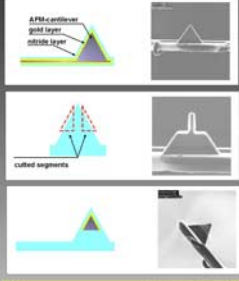
How to Solve the Constant Distance Problem?


- ➔ Commercial AFM-Tip
- Deposition of an electroactive layer
- Insulation of the metal film with a chemically inert layer
- Partial removal of the insulation layer
- ➔ Creation of a defined microelectrode
- Re-shaping of the AFM-Tip
- ➔ Well-defined and constant distance between microelectrode and sample surface



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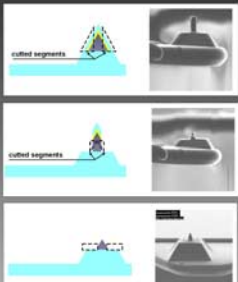
Fabrication Steps






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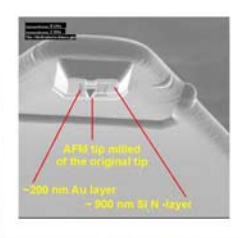
Fabrication Steps



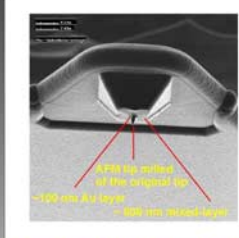


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Microelectrodes and Sub-Microelectrodes Integrated in AFM-Tips



Microelectrode (edge length 2 µm) integrated in an AFM-tip



Sub-microelectrode (edge length ~500 nm) insulated with mixed SiO/SiN-layers



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Conclusion

- ➔ Successful Integration of a Microelectrode in an AFM-Tip
- Simultaneous mapping of topographical and laterally resolved electrochemical information
- Reproducible fabrication of sub-microelectrodes by FIB-techniques
- Invariable and constant distance between microelectrode and sample surface

Outlook

- Improvement of insulation towards thinner films
- Variation of electrode geometry
- Multiple electrode configuration