1 – INTRODUCTION

Intermittent Contact Scanning ElectroChemical Microscopy (IC-SECM) is a new method of scanning probe microscopy that introduces distance control into conventional scanning electrochemical microscopy by integrating electrodes into atomic force microscopy. This overcomes the problem of unambiguously determining changes in surface topography and activity by oscillating the nanoelectrode at a fixed amplitude, and using amplitude damping as a feedback parameter to keep the tip a fixed distance from the surface. The goal of the project is to introduce nanoelectrodes into IC-SECM to greatly enhance the spatial resolution.

2 – NANOELECTRODES

Nanoelectrodes were made by sealing a platinum wire inside a capillary, and pulling under a laser puller to create a long, thin taper. This taper was then polished back to give a tip of the required size of 200-300 nm diameter.

3 – IMAGING

Figs. 5a&b: Small scale (40x20μm) scan of nanowires, in substrate generation-tip collection mode (left), and feedback mode (right)

4 – CONCLUSIONS AND FURTHER WORK

Nanoelectrodes have successfully been used to image hard surfaces with IC-SECM. Future work involves studying whether the transition to soft surfaces is feasible, whether by varying the amplitude and frequency of tip oscillation to get the required damping, or by using other parameters such as phase.

5 – REFERENCES