Local Conductivity Measurement on a High Quality Graphite by Multi-probe Scanning Tunneling Potentiometry

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Recently, miniaturization of electronic devices has been widely progressing and the development of the method for analyzing local conductivity has become extremely important. In this work, we show the results obtained by the multi-probe scanning tunneling potentiometry based on the combination of scanning tunneling microscopy (STM) and atomic force microscopy (AFM) techniques equipped with an optical zoom lens system. As shown in Fig. 1, we used a stiff electrochemically etched tungsten probe for STM and three Pt/Ir coated conductive cantilevers for making soft mechanical contacts. The sample was a ~2 μm thick defect-free graphite sheet. From the potential gradient measured with the resolution of few tens microvolts, an ideal high conductivity for the sample was well confirmed. Details will be discussed at the conference.

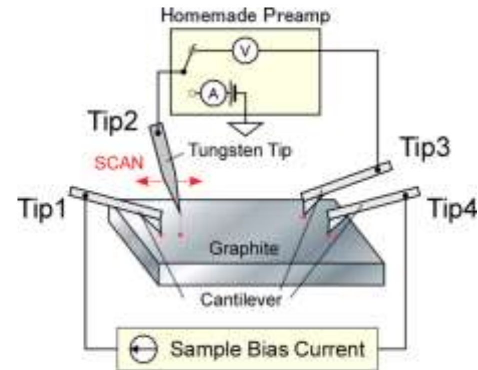

Fig. 1: Schematic diagram of the experimental setup