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**In-situ TEM observation on STM tunneling gap** SUHYUN KIM, YASUMASA TANISHIRO, KUNIO TAKAYANAGI, Tokyo Institute of Technology — Transmission Electron Microscope and Scanning Tunneling Microscope in an ultra high vacuum environment (UHV-TEM-STM) have been combined to simultaneously perform both high resolution TEM and atomically resolved STM experiments. This system was constructed for in-situ investigation of physical property of impurity atoms embedded below semiconductor surface. To image TEM and STM at the same time, crucial requirement is that, the STM image must be acquired under the electron beam irradiation. As a preliminary test, we used HOPG (Highly Oriented Pyrolytic Graphite) sample and tungsten tip as schematically shown in Fig 1(a). Fig 1(b) shows an atomic resolution STM image of HOPG obtained with 300mV sample bias and 3nA tunneling current even in the condition of the electron beam irradiation on the tip. TEM image can be simultaneously acquired by performing In-situ TEM observation on STM tunneling gap formed between the tip and a thin sample. Fig 1(a) Geometry of STM observation on STM tunneling gap Fig 1(b) STM image of HOPG obtained with 300mV sample bias and 3nA tunneling current

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