

**CONTROLLING LOCAL POLYMERIZATION AND DEPOLYMERIZATION
REVERSIBLY USING A SCANNING PROBE**

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The tip of the scanning tunneling microscope (STM) can induce local polymerization of molecules at designated positions in appropriate molecular films, if molecules in the films are well ordered. Namely, tunneling electrons flowing between a probe tip and a substrate with a molecular film on it can excite molecules in the film locally and cause local polymerization. By scanning the probe tip, any patterns of polymerized area can be created. In certain cases, spontaneous chain polymerization can be triggered by flowing tunneling electrons only at a fixed point. Not only current but also field applied by a probe tip, which ionizes molecules locally, is responsible for polymerization in certain cases. Methods of such local polymerization and electrical conduction in polymerized area are discussed. It is also demonstrated that not only polymerization but also depolymerization can be made in a reversible manner using the same probe tip at the same temperature (RT). Discussion will be made regarding the mechanism of this notable phenomenon.

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