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Synthesis of a long gold atomic strand incorporated with carbon atoms YOSHIFUMI OSHIMA, TOMOYA ONO, Osaka University, KUNIO TAKAYANAGI, Tokyo Institute of Technology, NGUYEN DUY HUY, Osaka University — Single metal or carbon atomic strands have attracted much interest because of their unique properties. They have been usually fabricated by stretching or thinning the junction between both electrodes, but limited to be several atoms in length at maximum. We show that a long atomic strand can be synthesized by pulling one-dimensional reconstructed structure formed on the electrode surface. In the transmission electron microscope combined with a scanning tunneling microscope, gold atoms were observed to be pulled out one-by-one from carbon contaminated gold (111) surface layer each 0.5 nm elongation till diminishing the layer. This observation was explained by the first-principle calculation, showing that two carbon atoms are incorporated at each interval (0.5 nm) between two neighboring gold atoms aligned along the [112] direction to form the one-dimensional reconstructed structure, when the gold (111) surface is contaminated with carbon atoms.

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