

Sequence-Specifically Platinum Metal Deposition on Enzymatically Synthesized DNA Block Copolymer

*Aya Tanaka, Yasutaka Matsuo, Yuichi Hashimoto, and Kuniharu Ijiro**

Department of Chemistry, Graduate School of Science, Hokkaido University, Kita-ku,
Sapporo, Hokkaido 001-0021, Japan, Research Institute for Electronic Science, Hokkaido
University, Kita-ku, Sapporo, Hokkaido 001-0021, Japan.

Supporting Information.

Materials and Methods

Materials HPLC purified oligodeoxynucleotides were purchased from Hokkaido System Science. Klenow fragment exo^- were purchased from New England Biolabs.

DNA extension the extension was carried out in 30 μl solution containing 60 mM KPi, pH 7.5, 5 mM MgCl_2 , 5 mM DTT, dNTPs, 0.1 μM template-primer molecules, and 7.5 U KF^- at 20 $^\circ\text{C}$. Concentration of dNTPs and reaction time are described in figure caption. The reaction was terminated by the addition of EDTA.

Platinum metal deposition on DNA block copolymer the DNA block copolymers combined with platinum were stretched and immobilized on a mica substrate washing a decon solution using the Langmuir-Blodgett (LB) method. Synthesized DNA block copolymers of 30 μ l (10 nM in base pairs) were solved in a 10 mM Tris-HCl (pH 7.8) solution containing 2.5 μ M cisplatin (The molar concentration of cisplatin relative to DNA base pairs is 250). Dihexadecyldimethylammounium bromide as an amphiphile reagent was spread on the DNA solution and a DNA-amphiphile polyion complex was formed. After reduction of cisplatin to platinum metal by addition of 10 ml of 25 mM dimethylamine borane solution, the DNA-amphiphile polyion complex monolayer was transferred onto a mica substrate at the surface pressure of 5 mN/m by the LB method.

AFM observation the DNA block copolymers combined with platinum metal were transferred on a mica substrate using the LB method described above. After desiccation overnight, they were observed by AFM (SEIKO, Japan).

STEM observation Lambda phage DNA combined with platinum metal was transferred on a carbon-coated TEM grid using the LB method described above. After desiccation overnight, they were observed by STEM (HD-2000, HITACHI).

Supporting Figures

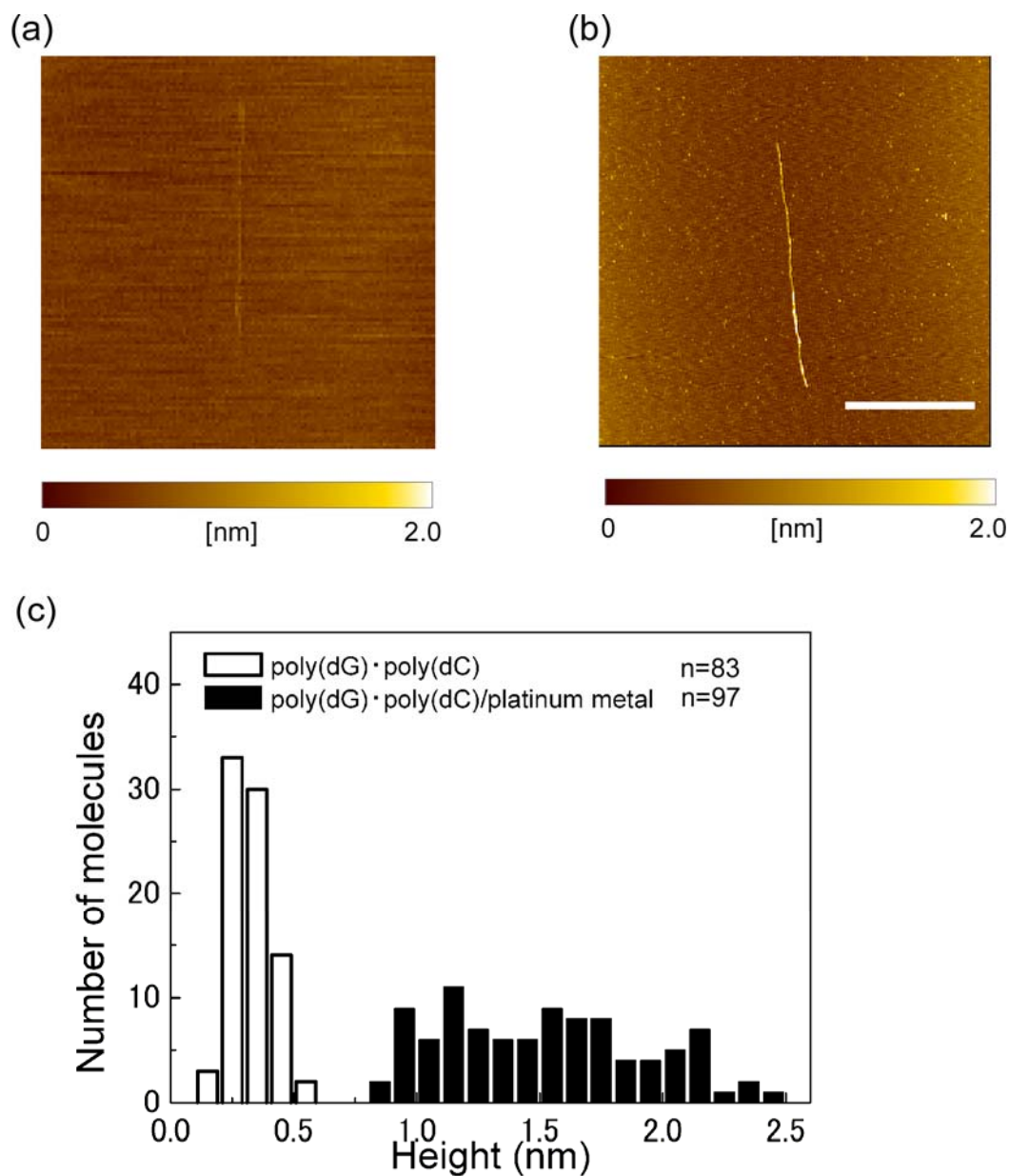


Fig. S1 AFM image of (a) a nonmodified poly(dG)·poly(dC) and (b) platinum metal bound to poly(dG)·poly(dC). These stretched and immobilized DNA molecules were prepared by the methods described in Materials and Methods. All scale bars are 1 μm . (c) Height histogram of (a) and (b). The height of (a) is from 0.2 nm to 0.6 nm (average, 0.27 nm). The height of (b) is from 0.8 nm to 2.5 nm (average, 1.37 nm).

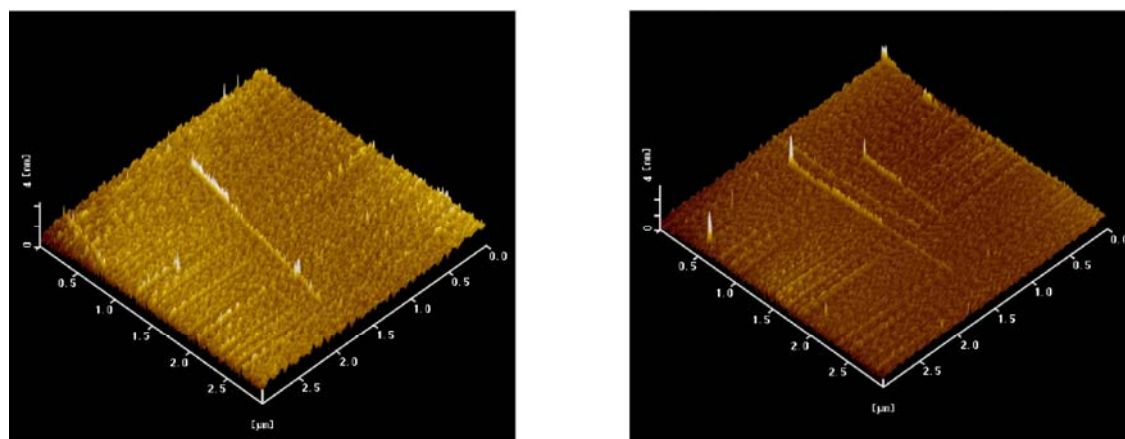


Fig. S2 AFM images of platinum metal bound to the DNA block copolymer.