

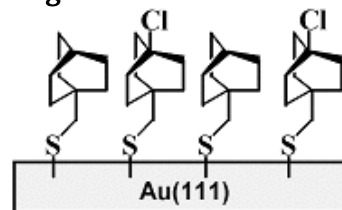
Differentiation of H- and Cl- Terminated Bicyclo[2.2.2]octane Moieties in a Mixed Self-Assembled Monolayer on Au(111) with Noncontact Atomic Force Microscopy

S. Fujii, U. Akiba, M. Fujihira

Department of Biomolecular Engineering, Tokyo Institute of Technology
4259 Nagatsuta, Midori-ku, Yokohama 226-8501, Japan

A mixed self-assembled monolayer (SAM) of two kinds of thiolate with a hydrogen- or chlorine-terminated bicyclo[2.2.2]octane moiety was formed on Au(111) as shown in Figure 1. Previous study on the mixed SAM showed that two kinds of thiolate were distinguishable with noncontact-atomic force microscopy using a Si tip with a native oxide layer [1]. Primarily, van der Waals force between an oxygen atom on a tip apex and different molecules on Au(111) can be responsible for molecular-dependent imaging of the mixed SAM. But, H- and Cl-terminal groups have different electronegativities, and thus additional electrostatic interactions such as interaction between permanent dipoles or charge-permanent dipoles on the tip and molecules, respectively, cannot be neglected. In this study, contribution of such electrostatic interactions to molecular-dependent imaging was investigated using other types of ionic tips [2] than the oxide covered Si tip.

Figure 1



[1] Fujii S, Akiba U and Fujihira M 2004 *Nanotechnology* **15** S19

[2] Foster A S, Barth C, Shluger A L, Nieminen R M and Reichling M 2002 *Phys. Rev. B* **66** 235417