

MAR06-2005-001426

Abstract for an Invited Paper  
for the MAR06 Meeting of  
the American Physical Society

**Formation Processes and (Photo-)electrochemical Properties of Organic Monolayers on Hydrogen Terminated Si(111).**

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Construction of molecular layers on solid surfaces is one of the most important subjects not only for fundamental science but also for a wide range of applications. The most studied mono-molecular layer system is self-assembled monolayers (SAMs) of alkanethiols on various metals especially on gold and SAMs with a wide variety of functionalities have been constructed. It may be more important, however, to construct ordered molecular layers with various functionalities on a semiconductor surface, Si in particular, as far as technological applications are concerned because of possible applications for molecular and biomolecular devices in conjunction with the advanced silicon technology. Here we followed the thermal and photochemical organic monolayer formation process of by ATR-IR, ellipsometry, and sum frequency generation spectroscopy, and constructed and investigated electrochemical and photoelectrochemical properties of the organic monolayers with electron transfer function, i.e., viologen moiety, on hydrogen-terminated Si(111) surface. Furthermore, effect of platinum nanoparticles deposited on the surface on hydrogen evolution reaction was also investigated (1). Photo-switching property was also introduced by incorporating a diarylethene moiety. (1) Masuda, T.; Uosaki, K. *Chem. Lett.* **2004**, 33,788.