Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

STM Observation of Molecular Adsorption on Graphene and Nitrogen Doped Graphene SEIJI OBATA, KOICHIRO SAIKI, University of Tokyo Department of Complexity Science and Engineering Graduate School of Frontier Sciences — Carbon alloy catalyst (CAC) shows catalytic activity to oxygen reduction reaction (ORR) and it is expected as a substitution of Pt in fuel cells due to its catalytic property. At present CAC are synthesized by burning organic compounds which contain nitrogen atoms such as phthalocyanine. The catalytic activity of CAC is lower than Pt. Since catalytic sites and oxygen reduction process is still unknown, elucidation of catalytic sites of CAC helps to synthesize high performance CAC. STM is a useful tool to investigate adsorption and reaction at atomic level. However, disordered structure of CAC makes it difficult to use STM for catalytic site observation. To overcome this difficulty, we synthesized nitrogen doped graphene (NG) and and pristine graphene (PG) on Pt (111) and used it as model catalyst to study the catalytic property of CAC. Oxygen adsorption is the first step of oxygen reduction reaction. Therefore we investigated the oxygen adsorption to NG and PG by STM. Oxygen adsorbed at domain boundary (DB) of NG?According to XPS measurement nitrogen atoms exist at edge site preferably. These results indicate that nitrogen atom enhances oxygen adsorption activity. In addition, actual reaction process occurs in H_2O. Thus we also investigated H_2O adsorption on NG.

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Date submitted: 30 Oct 2013 Electronic form version 1.4