Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Fast motion of the surface alcohol molecules deduced from sum-frequency vibrational spectroscopy JAEHO SUNG, Department of Physics, Sogang University, DOSEOK KIM, Department of Physics and Interdisciplinary Program of Integrated Biotechnology, Sogang University — Sum-frequency generation (SFG) vibrational spectroscopy was used to investigate the surface of the homolog series of alcohols from methanol to octanol. It was found that SFG signal strengths from the terminal methyl group of short-chain alcohols cannot be explained by assuming the surface molecules were fixed in time. Introduction of the rotational motion with time scale comparable to the dephasing time of the vibrational mode of the terminal methyl group ($\sim$0.7 picosecond) was able to explain the reduction of the SFG signal by motional averaging effect. This timescale of motion increased with the increase in the molecule size and bulk viscosity. Our result also suggests that surface alcohol molecules move faster as compared to the same molecules in the bulk liquid.

Doseok Kim
Department of Physics and Interdisciplinary Program of
Integrated Biotechnology, Sogang University

Date submitted: 25 Nov 2006 Electronic form version 1.4