Abstract Submitted for the MAR07 Meeting of The American Physical Society

Diffusion coefficient in hydrogel under high-frequency ultrasound AKIRA TSUKAMOTO, Depertment of Mechanical engineering, University of Tokyo, KEI TANAKA, TATSUYA KUMATA, YOSHIAKI WATANABE, Department of Electronics, Doshisha University, SHOGO MIYATA, Department of Biological Functions and Engineering, Kyusyu Institute of Technology, KATSUKO FURUKAWA, Depertment of Bioengineering, University of Tokyo, TAKASHI USHIDA, Center for Disease Biology and Integrative Medicine, University of Tokyo — Modulating hydrogel properties by external stimuli can be applied for drug delivery system. For example, ultrasound can enhance drug release from hydrogel by the mechanism which is not fully understood. We measured diffusion coefficient in hydrogel under high-frequency ultrasound to understand mass transport property. To estimate diffusion coefficient, FRAP (fluorescence recovery after photobleaching) technique was applied with time-lapse fluorescence microscopy and we analyzed fluorescence recovery after photobleaching of FITC-dextran ($4 \sim 40$ kDa) which was fully fused in agarose gel $(1 \sim 3 \%)$. As a result, diffusion coefficient was altered when agarose gel was sonicated by 1MHz ultrasound with 400kPa (peak-peak). We discussed several possible underlying mechanisms such as cavitation, heat and phase transition with extended experimental data.

> Akira Tsukamoto University of Tokyo

Date submitted: 13 Dec 2006

Electronic form version 1.4