Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Friction Reduction Using Self-Assembled Hydrogels MICHAEL J. MACKEL, JULIA A. KORNFIELD, California Institute of Technology — Friction of agarose-based hydrogels against bare glass is examined as a function of added linear polyelectrolyte using a stress rheometer to measure the angular velocity of a clean glass plate against the hydrogel surface as a function of applied torque and normal force. Incorporating linear dextran sulfate into 2 weight percent agarose hydrogel reduces friction on the hydrogel surface. The reduction of friction is a nonmonotonic function of dextran sulfate concentration: a 2 percent doping of dextran sulfate shows the minimum friction. Lubricity enhancement on the agarose doped with 2 percent dextran sulfate occurs at all normal forces examined (0.5, 1, 1.5, and 2 N) and is more pronounced at larger angular velocities. Rheological studies of agarose hydrogels doped with dextran sulfate suggest that the dextran sulfate does not interfere with the porous structure of the hydrogel when present in concentrations of 2 weight percent or less.

Michael J. Mackel
California Institute of Technology

Date submitted: 13 Nov 2006 Electronic form version 1.4