

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

A simple feature of yielding of dense suspensions of soft micro-hydrogel particles KENJI URAYAMA, Dept. Macromol. Sci. & Eng., Kyoto Institute of Technology, TAKU SAEKI, SHEN CONG, Dept. Mater. Chem., Kyoto University, SYOTA URATANI, Dept. Macromol. Sci. & Eng., Kyoto Institute of Technology, TOSHIKAZU TAKIGAWA, Dept. Mater. Chem., Kyoto University, MASAKI MURAI, DAISUKE SUZUKI, Shinshu University — The highly dense suspensions of soft micro-hydrogels with a narrow size distribution, which form a regular lattice structure, exhibit a simple feature in the yielding behavior: the yield strain γ_c [ca. 2.5% and ca. 4.8% for PNIPMA) and PNIPA hydrogel particles, respectively] is nearly independent of the cross-link concentration, particle diameter, and particle concentration (c) in the limited c range examined here, and γ_c is almost constant in a wide range of equilibrium shear moduli over two orders of magnitude. Further, no appreciable difference in γ_c is observed in the dense pastes with crystalline and glassy structures which are formed by mono- and bidisperse microgels, respectively. In addition, the highly dense suspensions of NIPA core–NIPMA shell microgels are similar in γ_c to those of NIPMA microgels. These results indicate that γ_c for the highly dense suspensions of soft micro-hydrogels depends primarily on the kind of constituent polymer near the particle surface. The yield strain γ_c is expected to be governed by short-range interactions such as adhesion and friction. [Reference] K. Urayama, T. Saeki, S. Cong, S. Uratani, T. Takigawa, M. Murai, Suzuki, *Soft Matter*, DOI: 10.1039/c4sm01841a.

Kenji Urayama
Kyoto Institute of Technology

Date submitted: 06 Nov 2014

Electronic form version 1.4