

Abstract Submitted  
for the MAR16 Meeting of  
The American Physical Society

**Phase Behavior and Micellar Packing of Impurity-Free Pluronic Block Copolymers in Water**<sup>1</sup> CHANG YEOL RYU, HANJIN PARK, Rensselaer Polytechnic Institute — We have investigated the impacts of the non-micellizable polymeric impurities on the micellar packing and solution phase behavior of Pluronic block copolymers in water. In particular, small angle x-ray scattering, rheology and dynamic light scattering techniques have been employed to elucidate how the low MW impurities affect the micellar packing and solution phase diagram in water, when ordered cubic structures of spherical micelles are formed. A silica slurry method has been developed using the competitive adsorption of the PEO-PPO-PEO triblock copolymers over the low MW polymeric impurities for a large scale purification of Pluronics and its purity of Pluronics has been assessed by interaction chromatography. Based on the comparative studies on micellar packing between As-Received (AR) and Purified (Pure) Pluronic F108 solutions, we found experimental evidence to support the hypothesis that the inter-micellar distance of Pluronic cubic structures in aqueous solution is governed by the effective polymer concentration in terms of PEO-PPO-PEO triblock copolymers. Removal of the impurities in AR F108 offers an important clue on window into the onset of BCC ordering via hydrodynamic contact between micelles in solution.

<sup>1</sup>NSF DMR Polymers

Chang Yeol Ryu  
Rensselaer Polytechnic Institute

Date submitted: 10 Nov 2015

Electronic form version 1.4