## Abstract Submitted for the MAR17 Meeting of The American Physical Society

Linear Diblock Copolymer Micellization Kinetics Probed by Integrated Microfluidic Device and Small-angle X-ray Scattering JOSEPH KALKOWSKI, CHANG LIU, PAOLA LEON-PLATA, MAGDALENA SZYMUSIAK, Univ of Illinois - Chicago, WEIFENG SHANG, SRINIVAS CHAKRAVARTHY, THOMAS IRVING, Illinois Institute of Technology, YING LIU, Univ of Illinois - Chicago, DEPARTMENT OF CHEMICAL ENGINEER-ING, UNIVERSITY OF ILLINOIS AT CHICAGO, CHICAGO, IL 60607 COL-LABORATION, DEPARTMENT OF BIOLOGY AND PHYSICS, ILLINOIS IN-STITUTE OF TECHNOLOGY, CHICAGO, IL 60616 COLLABORATION -Polymeric nanoparticles (NPs) for delivery of active pharmaceutical compounds are under rapid development as the need for advanced drug-delivery systems increase. Micelles, self-assembled from amphiphilic block copolymers, attracted attention because of their biocompatibility, better stability, and potential functionalities of targeting delivery. Nanoprecipitation, driven by solvent replacement, is one of the major processes for generating polymeric NPs. In order to optimize the structure of the NPs, the kinetics of micellization and drug nucleation and growth need to be well understood. However, the structural evolution is challenging to follow experimentally. With the development of synchrotron X-ray sources, time-resolved SAXS (TR-SAXS) integrated with a stopped-flow apparatus has become possible with a temporal resolution in the 100 millisecond time range. In this study, we have integrated a microfluidic mixer with TR-SAXS to catch the millisecond kinetics. Regimes of nuclei formation, merging, and polymer insertion were observed.

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