Abstract Submitted
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The hydration and ordering of lamellar block copolymer films prior to the formation of polymer vesicles[1] YOHEI KAMATA, Kuraray Co., Ltd., ANDREW PARNELL, Department of Physics and Astronomy, University of Sheffield, ANDREW DENNISON, ROBERT BARKER, PHILIPP GUTFREUND, Institut Laue-Langevin, MAXIMILIAN SKODA, ISIS, STFC, Rutherford-Appleton Lab, SHAOMIN MAI, Department of Chemistry, University of Sheffield, RICHARD JONES, Department of Physics and Astronomy, University of Sheffield
— Polymersomes – vesicles based on self-assembled bilayers in turn composed of amphiphilic copolymers – are good candidates for molecular delivery systems; hydrophilic molecules can be enclosed within the aqueous core, to be released by a trigger, which disrupts the vesicle's wall. The key to the use of these polymer vesicles as effective molecular delivery system is in the ability to efficiently encapsulate a molecular payload within the vesicle. To understand the formation mechanism of polymer vesicles via the thin film rehydration method, we have evaluated the hydration and ordering of PEO-PBO diblock copolymer thin films in a controlled water vapor atmosphere. We have performed Neutron Reflectivity, Ellipsometry and Atomic Force Microscopy measurements during the hydration process. These results show that the film swells slowly in the initial stage. It then swells rapidly at a certain critical point and makes ordered structure at the same time. The lamellae are gradually oriented parallel to the substrate with increasing water absorption.

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