Electronic Supplementary Material (ESI) for RSC Advances.

Electronic Supplementary Information

Amphiphilic Acrylamide Block Copolymer: RAFT Block Copolymerization and Monolayer Behavior

Shunsuke Yamamoto, *Tokuji Miyashita*, *Masaya Mitsuishi*

Institute of Multidisciplinary Research for Advanced Materials (IMRAM), Tohoku University, 2-1-1 Katahira, Aoba-ku, Sendai 980-8577, Japan

Kinetic Plot Showing ptPA Synthesis

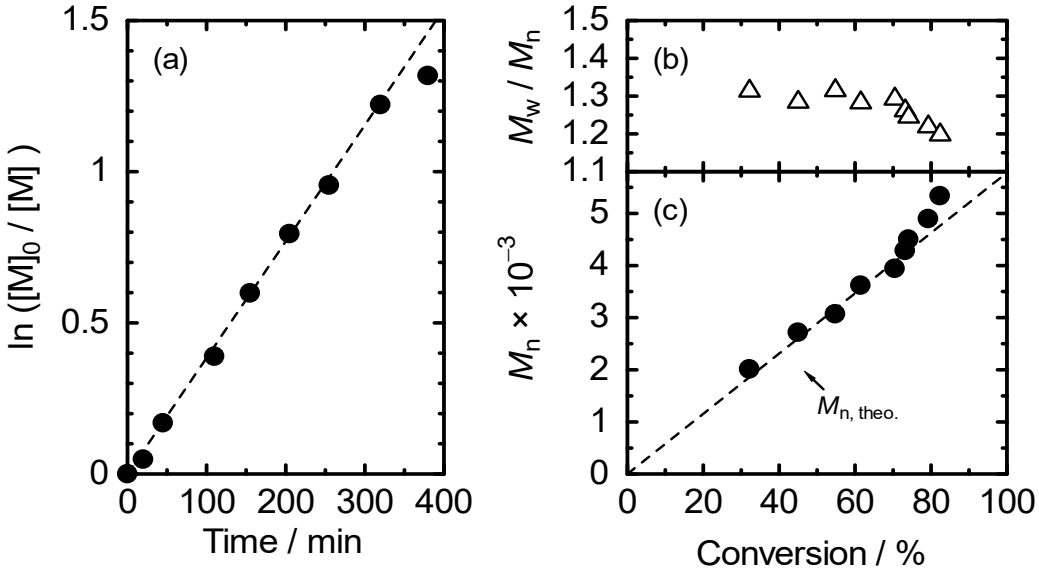

Figure S1. (a) First-order kinetic plot of ln([M]$_0$/[M]) versus time, (b) evolution of polydispersity index, and (c) number-average molecular weight for RAFT polymerization of tPA. The broken line in (c) represents the theoretical prediction. Reaction conditions: [tPA]/[CTA-Me]/[AIBN] = 219/5/1 in toluene.

^{1}H NMR Spectra of pDDA-*b*-ptPA

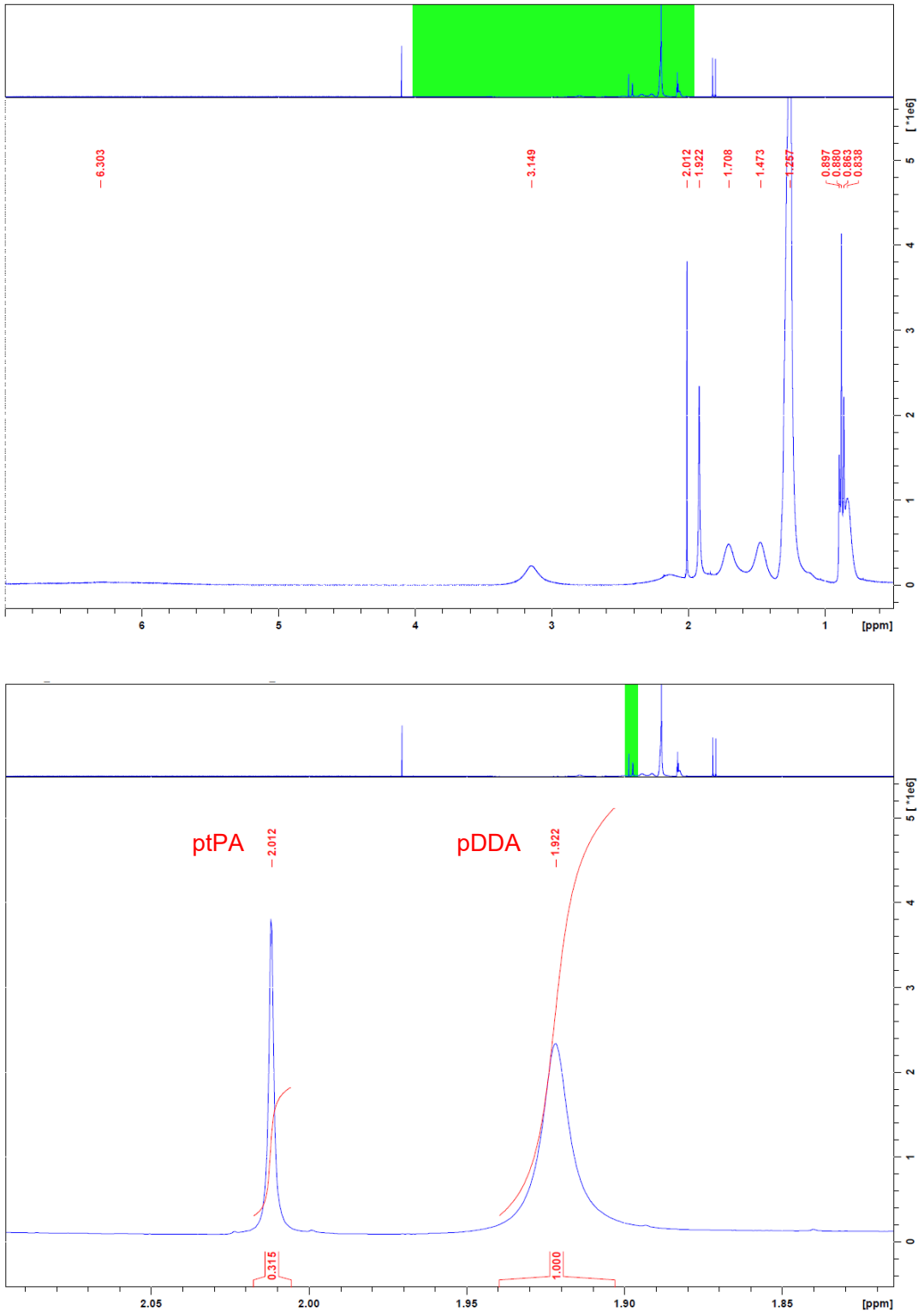

Figure S2. ^{1}H NMR spectra of pDDA-*b*-ptPA. Lower panel shows amplified images for the signals at around 2 ppm.

AFM Image of pDDA-*b*-ptPA LB Film

Preparation of pDDA-*b*-ptPA Langmuir-Blodgett (LB) films was conducted using an automatically controlled Langmuir trough (HBM-AP; Kyowa Interface Science Co. Ltd.). The monolayer was transferred onto a Si wafer at a surface pressure of 15 mN m^{-1}. The substrate was made hydrophobic with *n*-octyltrichlorosilane before use. The pDDA-*b*-ptPA LB film was investigated using atomic force microscopy (AFM) measurements (SPA-400; Seiko Instruments Inc.) under dynamic mode. The measurement was carried out using an Al-coated silicon cantilever (SI-DF20; Hitachi High-Tech Science Corp.).

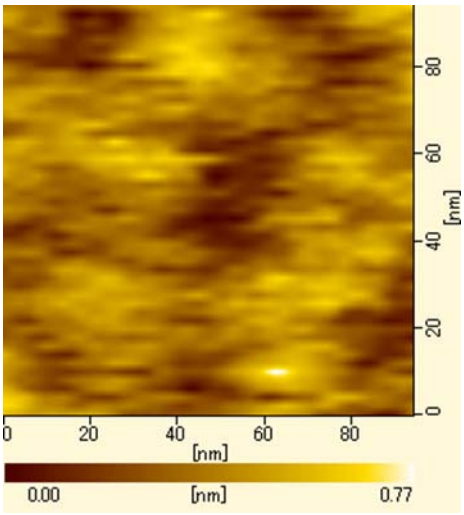

Figure S3. An AFM image of 2-layer pDDA-*b*-ptPA LB film.

Monolayer Stability at a Constant Pressure

Figure S4 shows temporal changes in the surface area of pDDA-*b*-ptPA with constant compression at 30 mN m^{-1} (red). The area remains unchanged with a minor decrease of ca. 5% over 1000 min, which indicates that pDDA-*b*-ptPA takes a stable monolayer at 30 mN m^{-1}. However, the surface area decreases with compressive force of 40 mN m^{-1} (blue), suggesting collapse of the monolayer at the air–water interface.

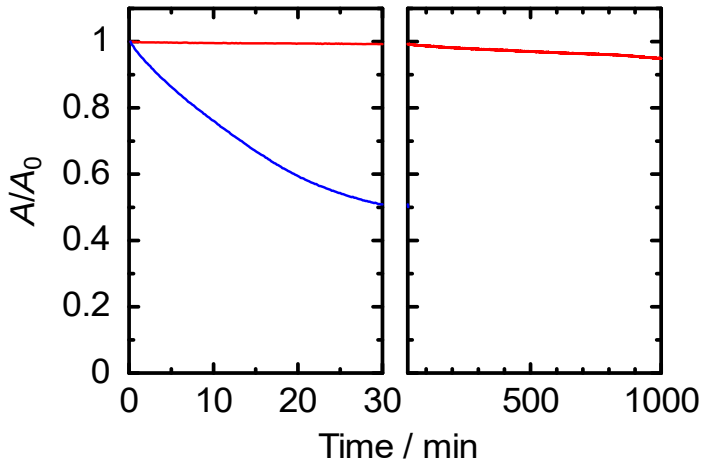

Figure S4. Temporal change in the surface area (A) of pDDA-*b*-ptPA on the compression at 30 (red) and 40 mN m^{-1} (blue): A_0 denotes the initial surface area.