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Langmuir structure of poly (2-vinylpyridine-b-hexyl isocyanate) rod-coil diblock copolymers at the air/water Interface[1] FARHAN AHMAD, KWANWOO SHIN, S.H. HAN, J.S. LEE, Dept of Materials Sc. & Engg, GIST, Gwangju, Korea — We conducted a systematic interfacial study for the complete range (5%-90% of rod mole percentage) of an amphiphilic rod-coil system, poly (hexyl isocyanate)-b-(2-vinylpyridine) at the air/water and air/solid interface. We applied Langmuir balance technique, scanning probe microscopy (SPM), transmission electron microscopy (TEM) and X-ray reflectivity for the complete characterization of the monolayer at the interfaces. The phase isotherms showed the well amphiphilic balance for the diblock copolymers, and the formation of stable monolayers. With the increasing rod content, the consistent increase in the monolayer packing density was observed by the phase isotherms and supported by X-ray reflectivity. SPM and TEM characterization showed their interesting surface morphology according to the varying rod mole percentage in the rod-coil system. Rod mole percentage 5%-15% showed micellar morphology. Rod mole percentage 23%-32% showed distinct and dispersed rods, whereas rod mole percentage 70%-90% showed well packed structure similar to lamella phase. We found the tendency of the diblock system to adopt a packed monomolecular structure has increased by the increasing rod content. This lead us to conclude that it is the hexyl-isocyanate (rod part) that governs mostly the interfacial behavior of rod-coil block copolymers.

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