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Charged triblock copolymer self-assembly into charged micelles YINGCHAO CHEN, KE ZHANG, JIAHUA ZHU, KAREN WOOLEY, DARRIN POCHAN, DEPARTMENT OF MATERIAL SCIENCE AND ENGINEERING UNIVERSITY OF DELAWARE TEAM, DEPARTMENT OF CHEMISTRY TEXAS A&M UNIVERSITY COLLABORATION — Micelles were formed through the self-assembly of amphiphilic block copolymer poly(acrylic acid)-block-poly(methyl acrylate)-block-polystyrene (PAA-PMA-PS). Importantly, the polymer is complexed with diamine molecules in pure THF solution prior to water titration solvent processing—a critical aspect in the control of final micelle geometry. The addition of diamine triggers acid-base complexation between the carboxylic acid PAA side chains and amines. Remarkably uniform spheres were found to form close-packed patterns when forced into dried films and thin, solvated films when an excess of amine was used in the polymer assembly process. Surface properties and structural features of these hexagonal-packed spherical micelles with charged corona have been explored by various characterization methods including Transmission Electron Microscopy (TEM), cryogenic TEM, z-potential analysis and Dynamic Light Scattering. The forming mechanism for this pattern and morphology changes against external stimulate such as salt will be discussed.

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