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**Dilute and Semidilute Solutions of a Nonionic, Rigid, Water-soluble Polymer** PAUL RUSSO[1], WAYNE HUBERTY[2], DONGHUI ZHANG[3], Louisiana State University, WATER-SOLUBLE RODLIKE POLYMER TEAM COLLABORATION — The solution physics of random polymer chains was established largely on the behavior of commercial polymers such as polystyrene for organic solvents or nonionic poly(ethyleneoxide) for aqueous solvents. Not only are these materials widely available for industrial use, they can be synthesized to be essentially monodisperse. When it comes to stiff polymers, good choices are few and less prone to be used in industrial applications. Much was learned from polypeptides such as poly(benzylglutamate) or poly(stearylglutamate) in polar organic solvents and nonpolar organic solvents, respectively, but aqueous systems generally require charge. Poly($N_\varepsilon$-2-[2-(2-Methoxyethoxy) ethoxy]acetyl-L-Lysine) a.k.a. PEGL was pioneered by Deming and coworkers. In principle, PEGL provides a convenient platform from which to study stiff polymer behavior—phase relations, dynamics, liquid crystal formation and gelation—all with good molecular weight control and uniformity and without electrical charge. Still, a large gap in knowledge exists between PEGL and traditional rodlike polymer systems. To narrow this gap, dynamic and static scattering, circular dichroism, and viscosity measurements have been made in dilute and semidilute solutions as necessary preliminaries for lyotropic liquid crystalline and gel phases. Supported by NSF DMR 1306262.

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