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Aqueous Gemini Surfactant Self-Assembly into Complex Lyotropic Phases MAHESH MAHANTHAPPA, GREGORY SORENSON, Department of Chemistry, University of Wisconsin-Madison, 1101 University Ave., Madison, WI 53703 — In spite of the potentially wide-ranging applications of aqueous bicontinuous lyotropic liquid crystals (LLCs), the discovery of amphiphiles that reliably form these non-constant mean curvature morphologies over large phase windows remains largely serendipitous. Recent work has established that cationic gemini surfactants exhibit a pronounced tendency to form bicontinuous cubic (e.g. gyroid) phases as compared to their parent single-tail amphiphiles. The universality of this phenomenon in other surfactant systems remains untested. In this paper, we will report the aqueous LLC phase behavior of a new class of anionic gemini surfactants derived from long chain carboxylic acids. Our studies show that these new surfactants favor the formation of non-constant mean curvature gyroid and primitive ("Plumber's Nightmare") structures over amphiphile concentration windows up to 20 wt% wide. Based on these observations, we will discuss insights gained into the delicate force balance governing the self-assembly of these surfactants into aqueous bicontinuous LLCs.

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