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Thermotropic liquid crystalline properties of amphotropic branched glycolipids GUANGXUN LIAO, Liquid Crystal Institute, Kent State University, Kent OH 44242, KELLY ZEWE, Departments of Physics and Chemistry, Geneva College, Beaver Falls, PA 15010, JESSICA HAGERTY, Department of Biology, Kent State University, Kent OH 44242, RAUZAH HASHIM, Chemistry Department, University of Malaysia, 50603 Kuala Lumpur, Malaysia , ANTAL JAKLI, Liquid Crystal Institute, Kent State University, Kent OH 44242 — Glycolipids are amphotropic liquid crystals forming lyotropic liquid crystals in aqueous solutions and thermotropic liquid crystals in their dry form. We report studies of six different branched glycolipids: four maltoside and two glucoside lipids in their dry form. Optical birefringence, electrical conductivity, DSC, and dielectric spectroscopy measurements were employed to characterize the phase structures of the materials. In general they exhibit a wide ($>100^oC$) mesophase (smectic, columnar) range with low (0.01-0.04) birefringence. They have large (60-120) dielectric susceptibility mainly proportional to the number of polar sugar heads. Depending on the temperature the relaxation frequency of the susceptibility varies from $<$100Hz to $>$1MHz, mainly determined by the hydrogen bonding between the polar sugar heads. Interestingly in heating the materials with long hydrophobic chains show optically isotropic phase between the smectic and columnar phases. Such a situation when more phases appear in heating than cooling has never been observed in other thermotropic liquid crystals.

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