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The Effects of Polyunsaturated Lipid Components on bilayer Structure Y. PRAMUDYA, A. KISS, LAM T. NGUYEN, J. YUAN, LINDA S. HIRST, Center for Material Research and Technology, Florida State University — Polyunsaturated fatty acids (PUFAs), such as DHA (Docosahexanoic Acid) and AA (Alphalinoleic Acid) have been the focus of much research attention in recent years, due to their apparent health benefits and effects on cell physiology. They are found in a variety of biological membranes and have been implicated with lipid raft formation and possible function, particularly in the retinal rod cells and the central nervous system. In this work lipid bilayer structure has been investigated in lipid mixtures, incorporating polyunsaturated fatty acid moieties. The structural effects of increasing concentrations of both symmetric and asymmetric PUFA materials on the bilayer structure are investigated via synchrotron x-ray diffraction on solution samples. We observe bilayer spacings to increase with the percentage of unsaturated fatty acid lipid in the membrane, whilst the degree of ordering significantly decreases. In fact above 20% of fatty acid, well defined bilayers are no longer observed to form. Evidence of phase separation can be clearly seen from these x-ray results and in combination with AFM measurements.

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