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Supramolecular structure of monohydroxy alcohols

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Monohydroxy alcohols have been scrutinized as a model of hydrogen bonded fluids. These hydrogen bonds are essential for the structure and dynamics of water, aqueous solutions and alcohols [1]. Monohydroxy alcohols are supposed to form supramolecular structures via hydrogen bonding in the liquid phase. We have investigated various alcohols by X-ray diffraction (XRD) over a temperature range from 175K to 405K at beamline BL9 at synchrotron light source DELTA (TU Dortmund). The supramolecular structures of 2E1H (2-ethyl-1-hexanol) and 4M3H (4-methyl-3-heptanol) mixtures and pure monohydroxy alcohols such as 6M3H (6-methyl-3-heptanol) and 5M3H (5-methyl-3-heptanol) were studied. Dielectric spectroscopy studies suggest ringlike arrangements for 4M3H and 5M3H (200K-300K), while chain arrangements were observed at 2E1H and 6M3H (175K-275K) [2]. We will discuss the results of the XRD measurements in relation to the supramolecular structures and compare them with the results of dielectric spectroscopy.

[1] Kaatz, U., et al. "Hydrogen network fluctuations and dielectric spectrometry of liquids". *Journal of Non-Crystalline Solids*. (2002), 305(1), 19-28. [2] Singh, L. P., et al. "Dynamics of glass-forming liquids. XVII. Dielectric relaxation and intermolecular association in a series of isomeric octyl alcohols." *The Journal of chemical physics*. (2013), 139(14), 144503.

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