which can monitor the rheological properties of liquids between two surfaces as a function of surface separation distance (D) from μm to contact with nm resolution. In this study, we investigated the rheological properties of a liquid crystal, 4-cyano-4'-hexylbiphenyl (6CB), under the electric field which induces the orientational change of 6CB. Resonance curves were obtained by measuring the amplitude of shear as a function of angular frequency. Polarizing microscopy confirmed that 6CB was in the planar orientation between mica surfaces without electric field, and in the homeotropic orientation under the electric field (28 V, 1 kHz). The viscosity of 6CB was larger for the case of 0 V than the case of 28 V at 370-14 nm, which agreed with Miesowicz viscosity. Below D=14 nm, the viscosity increased similarly both at 0 V and 28 V, indicating the same orientation of 6CB under confinement.

1) M. Mizukami, K. Kusakabe, and K. Kurihara, Prog. Colloid Polym. Sci., 128, 105, (2004)

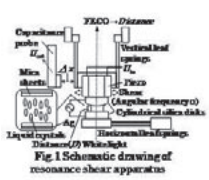

Fig.1 Schematic drawing of resonance shear apparatus

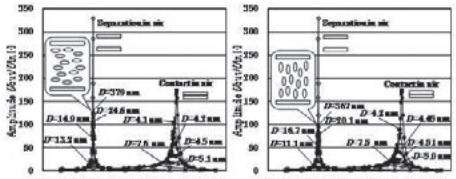

Fig.2 Resonance curves (Up) 0 V (Down) 28 V

Keywords: liquid crystal, orientation, rheology

P12.06.19

Acta Cryst. (2008). A**64**, C552

Pressure-induced structural changes of liquid As, Sb, and IV-VI compounds

Ayano Chiba[1], Masatoshi Tomomasa[1], Takazumi Hayakawa[1], Andreas Hinzmann[1], Ryota Takahashi[1], Junpei Nakamura[1], Robert L McGreevy[2], Kazuhiko Tsuji[1]

[1]Keio University, Department of Physics, Hiyoshi 3-14-1, Kohoku-ku, Yokohama, Kanagawa, 223-8522, Japan, [2]Rutherford Appleton Laboratory, Chilton, Didcot, Oxfordshire OX11 0QX, UK, E-mail：ayano@phys.keio.ac.jp

Pressure-induced structural transformations have recently been attracting a lots of attentions. For example, the finding of pressure-induced first-order phase transition in fluid Phosphorous is very interesting in that it showed a possibility of a novel border which separates one fluid phase from another. We investigated the structure of heavier group V elements As and Sb, and IV-VI compounds such as GeS, GeSe, GeTe, PbSe, PbTe, SnSe, SnTe, in liquid phase, by high-temperature high-pressure X-ray diffraction. The intermediate-range structure of liquid As and GeSe was found to change by pressure; we suggest a change from two- to three-dimensional structure. We also found that R2/R1 (the ratio of the second peak position to the first of the pair distribution function) approaches root two with compression. This result show that the bond angle 90 degree is preferred in a certain pressure range. Interestingly this ratio R2/R1 was found to change its pressure dependence when it passes root two. This indicates that further compression causes another structure. For liquid Sb and SnTe, the structure at ambient pressure has been conventionally assigned to a SC-like structure. However we found that the structure is not SC-like in low pressures, and our results suggest a considerable covalency in the bonds. With compression, the structure factor S(Q) showed a similar change to each other for these two liquids, and we found a hump in S(Q) (which is next to the first peak) rapidly and sharply changes at a certain pressure range. The overview of the pressure-induced structural changes for liquid group-V (and IV-VI compounds) will be given in the presentation, and systematic results and differences from crystalline pressure sequences will be shown.

Keywords: liquid structure, energy-dispersive X-ray diffraction, liquid alloys

P12.07.20

Acta Cryst. (2008). A**64**, C552

Low resolution structure of synthetic melanin aggregates in aqueous solutions and organic solvents

Iris L Torriani[1,2], Julio C Silva[1,2], Douglas S Galvao[1], Marilia Caldas[3], Carlos F Graeff[4]

[1]University of Campinas, Condensed Matter Physics, Physics Institute - C.P. 6165, Campinas, Sao Paulo, 13083-970, Brazil, [2]Brazilian National Sincrotron Laboratory (LNLS), Campinas, Brazil, [3]UNESP - FC Bauru, SP, Brazil, [4]IFUSP - Sao Paulo, Brazil, E-mail：torriani@ifi.unicamp.br

In an effort to find out details of the melanin fundamental structural unit, a great amount of information has been gathered using several techniques. The local short range order of the melanin molecular clusters has been described as consisting of five to seven 5,6-indolequinone units, arranged in planes which are pi-stacked with a spacing of 0.34 nm. Typical cluster size is 1.5-2.0 nm in lateral dimensions and 1.0 nm; in height. Nonetheless, structural details and dimensions of the aggregates are still not clearly defined and experiments did not answer the key question concerning the identification of the fundamental melanin protomolecule. More recently, small angle scattering of X-rays (SAXS) and neutrons (SANS) were performed. Several authors used these techniques, which are well designed to study macromolecules in solution to find details of melanin-copper ions interaction as well as chemical bleaching effects. A diversity of aggregated structures were proposed for these nanoscaled particles based on size and apparent shape. In this presentation we report the results of SAXS experiments performed with melanin synthetized from L-dopa and L-tyrosine in organic solvents, which were reported to be very effective for thin film formation. Water-based synthetic melanin was also studied for comparison purposes, since molecular aggregation behavior is known to vary with the route used for the synthesis. Reliable data was obtained for the water-based and DMSO dispersions. Data analysis was performed by conventional IFT methods and the overall shape and dimensional parameters of the melanin particles were obtained. Using ab-initio calculations, a low resolution 3D model is proposed for the basic melanin particle in aqueous media and DMSO.

Sponsorship: CNPq, LNLS

Keywords: biologically important substances, SAXS, melanine

P12.07.21

Acta Cryst. (2008). A**64**, C552-553

Long period structure in D_2O/3-methylpyridine induced by adding salt or ionic surfactant

Hideki Seto[1], Koichiro Sadakane[2], Natsuki Iguchi[2], Hitoshi Endo[3]

[1]High Energy Accelerator Research Organization, Institute of Materials Structure Science, 1-1 Oho, Tsukuba, Ibaraki, 305-0801, Japan, [2]Department of Physics, Kyoto University, [3]Institute of Solid State Physics, The University of Tokyo, E-mail：hideki.seto@kek.jp

The binary mixture of water and 3-methylpyridine, which shows