



	<b>Experiment title:</b> Influence on the lengths of side chain in the crystallization of poly-di-alkyl siloxanes as an influence of pressure-temperature	<b>Experiment number:</b> SC-415
<b>Beamline:</b> ID11-BL2	<b>Date of experiment:</b> from: 17th Apr 1998                      to: 21 <sup>st</sup> Apr 1998	<b>Date of report:</b> 01 <sup>st</sup> Sept. 1998
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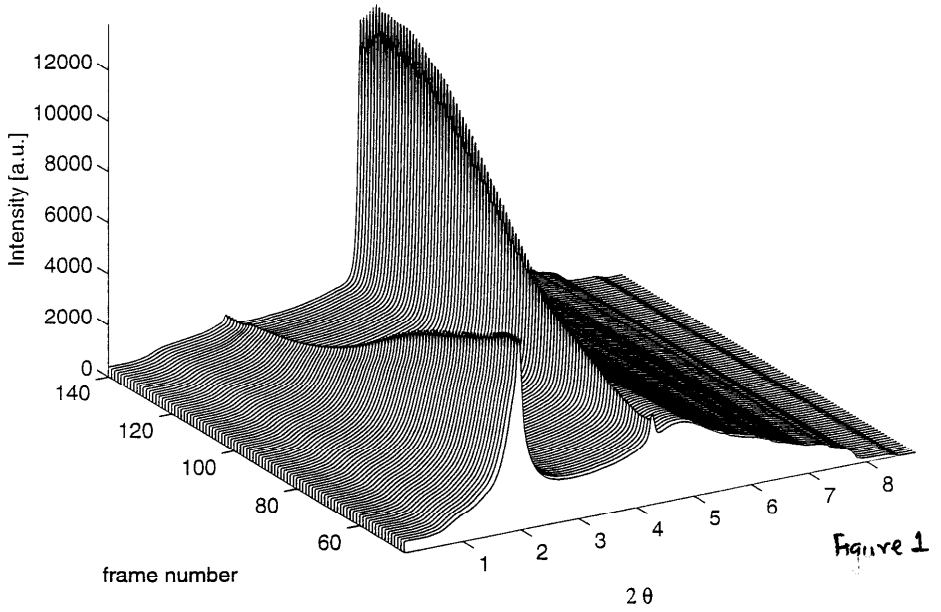
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**Report:**

Here we report on some of the preliminary findings on the series of polymers poly-di-alkyl siloxanes. Poly-di-alkyl siloxanes, with alkyl groups like ethyl, butyl, pentyl, hexyl crystallizes via the mesophase on cooling from the melt at the atmospheric pressure. Several polymorphs can be obtained in the crystalline phase, which are mainly controlled by the kinetics of crystallization, i.e. cooling rate. In the mesophase, these polymers are in the hexagonal phase. On crystallization in the hexagonal phase, extended chain morphology can be obtained, due to high chain mobility along the c-axis of the unit cell. Arrangement of the main chain in the hexagonal column plays a prominent role. Our work performed at ESRF on these series of siloxanes, at the elevated p and T, show some novel features which are summarised in Fig 1 and 2. The salient features of our findings are that at the pressures like 800 bars, even a short side chain like butyl in poly-butyl-siloxane can influence the crystallization behaviour of the main chain. Fig. 1 shows that on decreasing temperature from frame 0 to 140 isobarically, the peak at 2°, initially present for the main chain packing decreases in intensity, while the broad shoulder around 5.5° decreases or nearly diminishes with the enhancement in intensity of sharp peak at approximately 4.8°. The peak at 4.8° originates from the packing of the side chains. These results clearly show that packing of side chains on cooling influences the packing of main chain. The process being fully reversible as seen on cooling, Fig.2.

poly-di-butyl siloxane decreasing T at P=800bar



poly-di-butyl siloxane increasing T at P=800bar

