

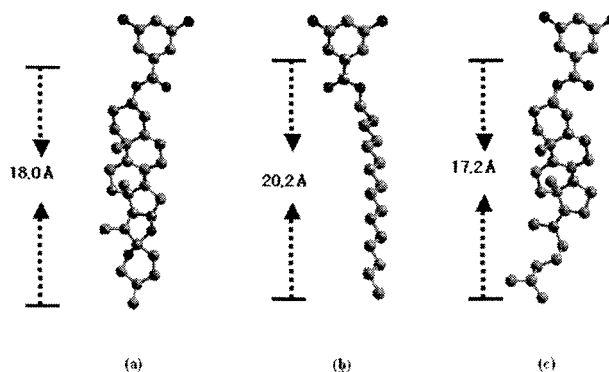
P-2-07

Effect of Side Chain Structure of Polyimides on a Pretilt Angle of Liquid Crystal Cells

In-kak Song¹, Mi Ra Lee, Jae Min Oh² and Mi Hye Yi^{1*}

¹Advanced Materials Division, Korea Research Institute of Chemical Technology, P. O. Box 107, Yuseong, Daejeon, 305-600, Korea ; ²Cheil Industries Inc., 332-2, Gocheon-dong, Uiwang-si, Gyeonggi-do, 437-711, Korea

A series of polyamic acids had been synthesized from cyclobutane-1,2,3,4-tetracarboxylic dianhydride and 4, 4'-diaminodiphenyl methane and functional diamines with various side chain structures. The functional diamines, 3,5-diamino benzoic acid (3 β , 5 β , 25S)-spiro-stan-5-en-3-yl ester (DA-SS), 3,5-diamino benzoic acid hexadecane-1-yl ester (DA-ES) and 3,5-diamino benzoic acid 10,13-dimethyl-17-(6-methylheptan-2-yl)-2,3,4,7,8, 9,10,11,12, 13,14,15, 16,17-tetradecahydro-1H-cyclopenta [a] phenanthren-3-yl ester (DA-CH), which had long alkyl or rigid alicyclic side chains with different flexibility. Pretilt angles of liquid crystal were measured and investigated factors affecting on the pretilt angles. The pretilt angles of the liquid crystal on the polyimide (CPI-1) with rigid side group was 0.6°, on the other hand, the pretilt angle on the CPI-2 and 3 with flexible side chains were very high above 89.6°. Furthermore, the pretilt angle of liquid crystal on the CPI-3 film having rigid cylindrical structure with 6-methylheptyl at the chain end was still high above 86.0° even after the rubbing process.



Scheme 1. Energy minimized structures of the functional diamines (a) DA-SS (b) DA-ES (c) DA-CH

References

1. Lee S. W.; Chae B.; Lee B.; Choi W.; Kim S. B.; Kim S. I.; Park S.-M.; Jung J. C.; Lee K. H.; Ree M *Chem Mat* **15**, 3105 (2003).
2. Lee, Y. J.; Choi, J. G.; Song I.; Oh J. M. and Yi, M. H. *Polymer* **96**, in revision (2005).