



## INTISARI

### Kajian Tentang Efek-efek Termo-mekanik dari *Main Chain Liquid Crystal Elastomer* (MCLCE) Homeotropik

Oleh

Hadiyati Idrus

08/274821/PPA/2572

Telah dikaji efek-efek termo-mekanik dari *main chain liquid crystal elastomer* (MCLCE) homeotropik dengan konsentrasi *cross-linker* 8%, 12%, 14%, dan 16%. Sampel MCLCE homeotropik diamati melalui proses pemanasan dan pendinginan dari suhu 30°C sampai 120°C. Foto sampel diambil setiap kenaikan suhu 1°C dan diukur panjangnya. Efek-efek termo-mekanik MCLCE homeotropik dikaji dari pengukuran perubahan panjang relatif,  $\lambda$ , *shape anisotropy*,  $\Delta\lambda$ , ekspansi maksimum,  $\lambda_{\max}$ , dan perubahan volume sampel,  $(V(T)/V(0))$ . Pertambahan panjang MCLCE meningkat tajam di sekitar suhu transisi nematik isotropik,  $T_{ni}$ . Semakin tinggi konsentrasi *cross-linker*, semakin besar ekspansi dan *shape anisotropy* MCLCE homeotropik. Perubahan volume MCLCE relatif konstan pada fase nematik dan isotropiknya, namun mengalami perubahan tajam di sekitar suhu  $T_{ni}$ .

**Kata kunci:** *Main Chain Liquid Crystal Elastomers* (MCLCE) homeotropik, efek-efek termo-mekanik.

## ABSTRACT

### Study of Thermo-mechanical Effects of Homeotropic Main Chain Liquid Crystal Elastomer (MCLCE)

By

Hadiyati Idrus  
08/274821/PPA/2572

Thermo mechanical effects of homeotropic Main Chain Liquid Crystal Elastomer (MCLCE) with concentration of cross-linkers 8%, 12%, 14%, and 16% has been studied. Homeotropic MCLCE's sample was observed through heating and cooling processes from 30°C up to 120°C. The picture of sample was taken every 1°C and measured. Thermo-mecanical effects of homeotropic MCLCE was studied from the measurement of the relative changes of the length,  $\lambda$ , *shape anisotropy*,  $\Delta\lambda$ , maximum expansion,  $\lambda_{\max}$ , and the volume changes,  $(V(T)/V(0))$ . The length of homeotropic MCLCE rises faster significantly around the nematic isotropic transition temperature,  $T_{ni}$ . As concentration of cross-linker increase, the expansion and shape anisotropy of homeotropic MCLCE increase. The volume changes of homeotropic MCLCE relatively constant in nematic and isotropic phase, but have changed significantly around  $T_{ni}$  temperature.

**Keywords:** homeotropic Main Chain Liquid Crystal Elastomer (MCLCE), thermo-mechanical effects