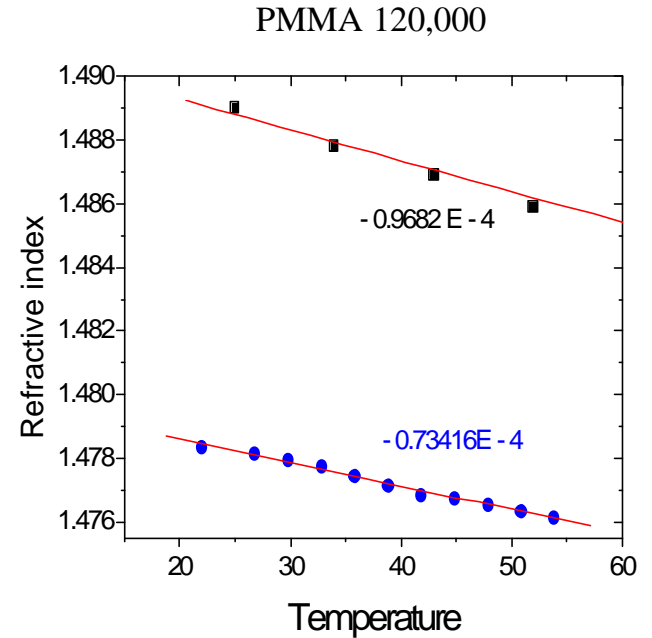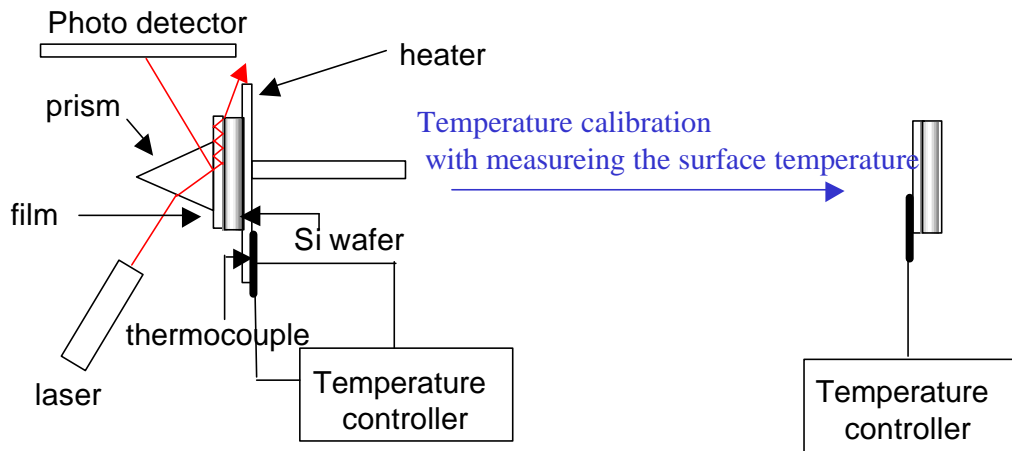# Measurement of the thermo-optic coefficients of polymer films by using prism coupler

Sairon Tech.

Prism contact method

- Temperature difference between heater and wafer

- temperature variation in the prism is not controlled

Photo detector

prism

heater

film

Si wafer

laser

thermocouple

Temperature controller

Temperature calibration
with measureing the surface temperature

Temperature controller

PMMA 120,000

- 0.9682 E - 4

- 0.73416E - 4

Refractive index

Temperature

$dn/dT = - \mathbf{0.9682} \times 10^{-4} / \,^o C$ (at 633nm)

$dn/dT = - \mathbf{0.7316} \times 10^{-4} / \,^o C$ (at 1550nm)

Prism coupler

- Problem
- ✓ The temperature difference between the heater and the wafer
  → we need the precise (exact) measurements of wafer temperature

- Direct contact the thermocouple To Wafer

- find a new method of raising temperature of the wafer
  → Use a silicon heater
  → Use a voltage instead of silicon heater.
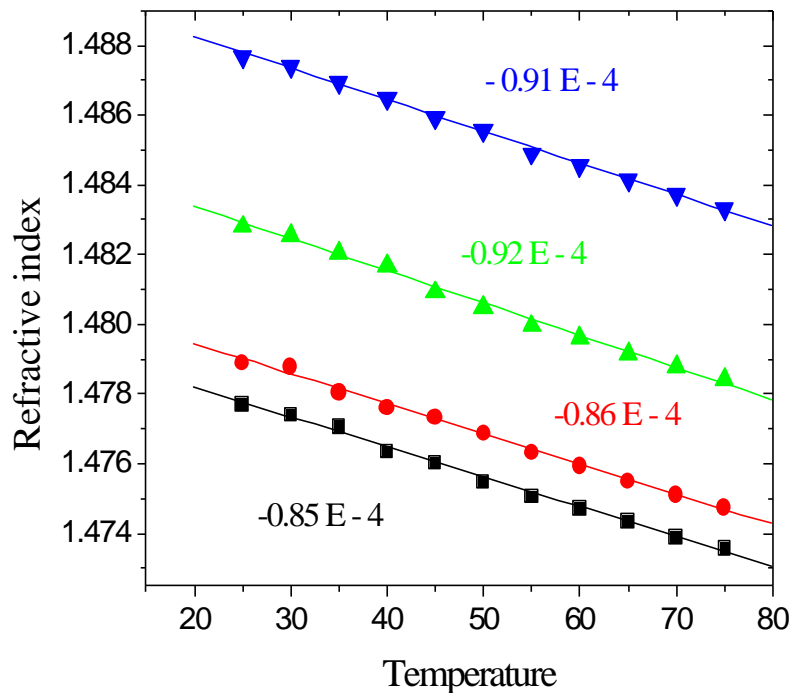
Measurement of wafer temperature

- Direct contact the thermocouple To Wafer

- Use silver paste and aluminum tape use a Thermo couple as contacting method
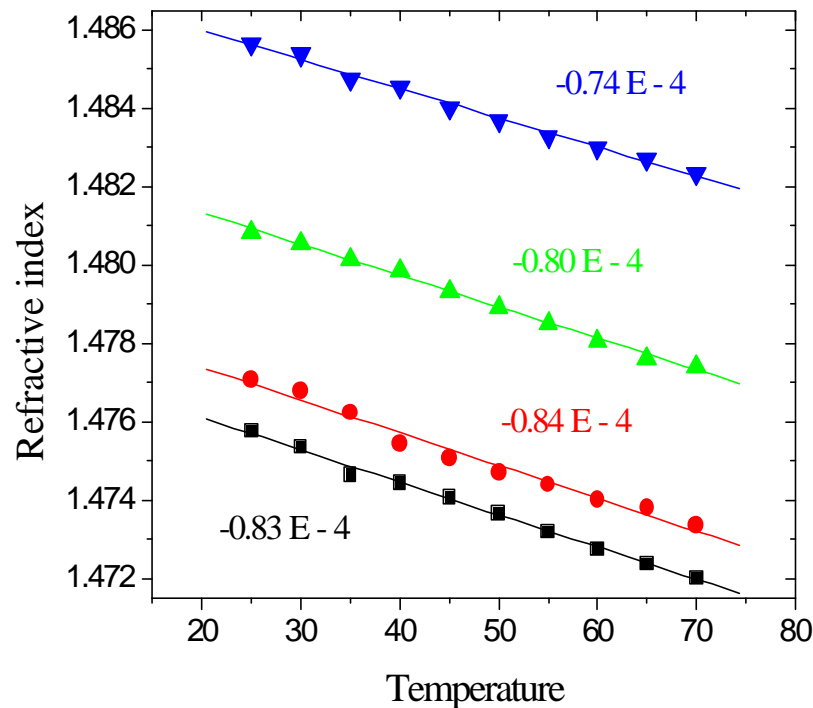
    →   similar results

$M_w = 93,000$ silver paste

$M_w = 93,000$ aluminum tape
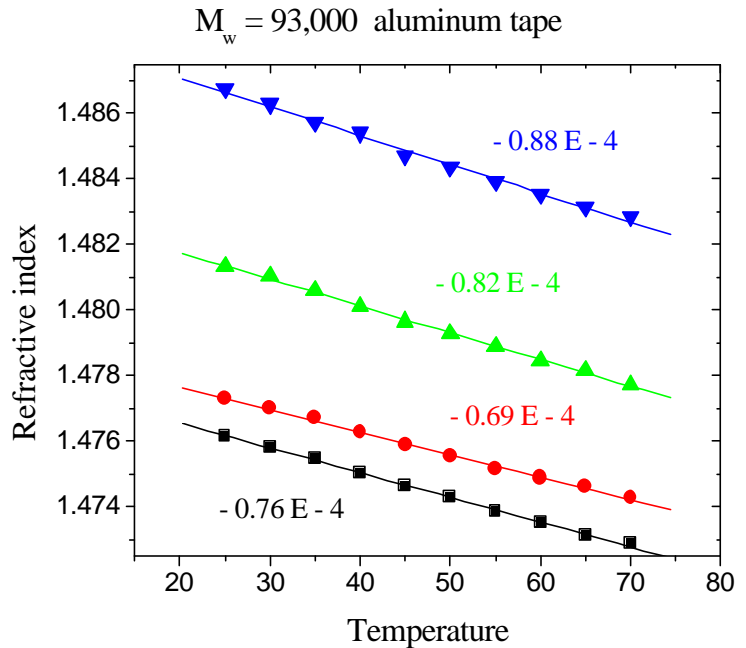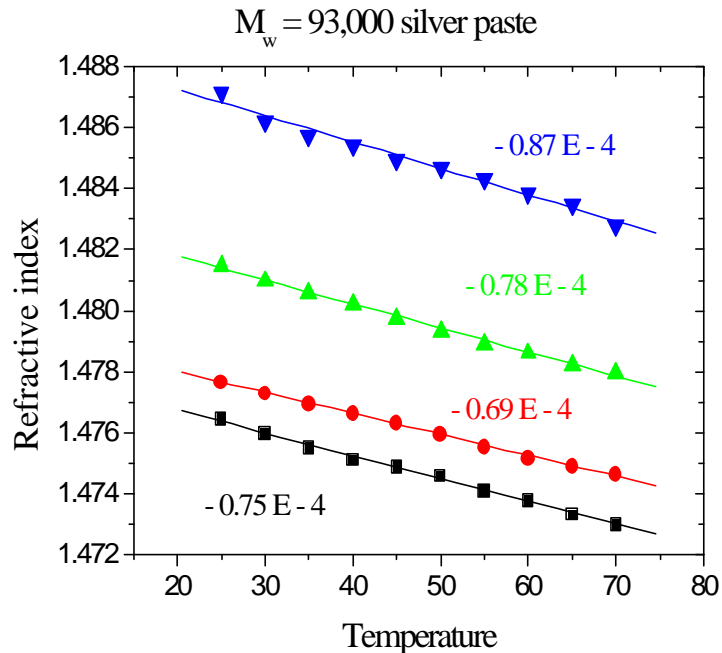
Measurement of dn/dT(PMMA)
by using silicon heater

Summary of dn/dT data of PMMA

wave length	By silicon heater		
	350,000	120,000	96,000
633nm	-0.88	-0.91	-0.74
830nm	-0.82	-0.92	-0.80
1310nm	-0.69	-0.86	-0.84
1550nm	-0.76	-0.85	-0.83