Fig. 3-10 I-V characteristic for different concentration of ZnO-loaded (NR+NBR) rubber blends.

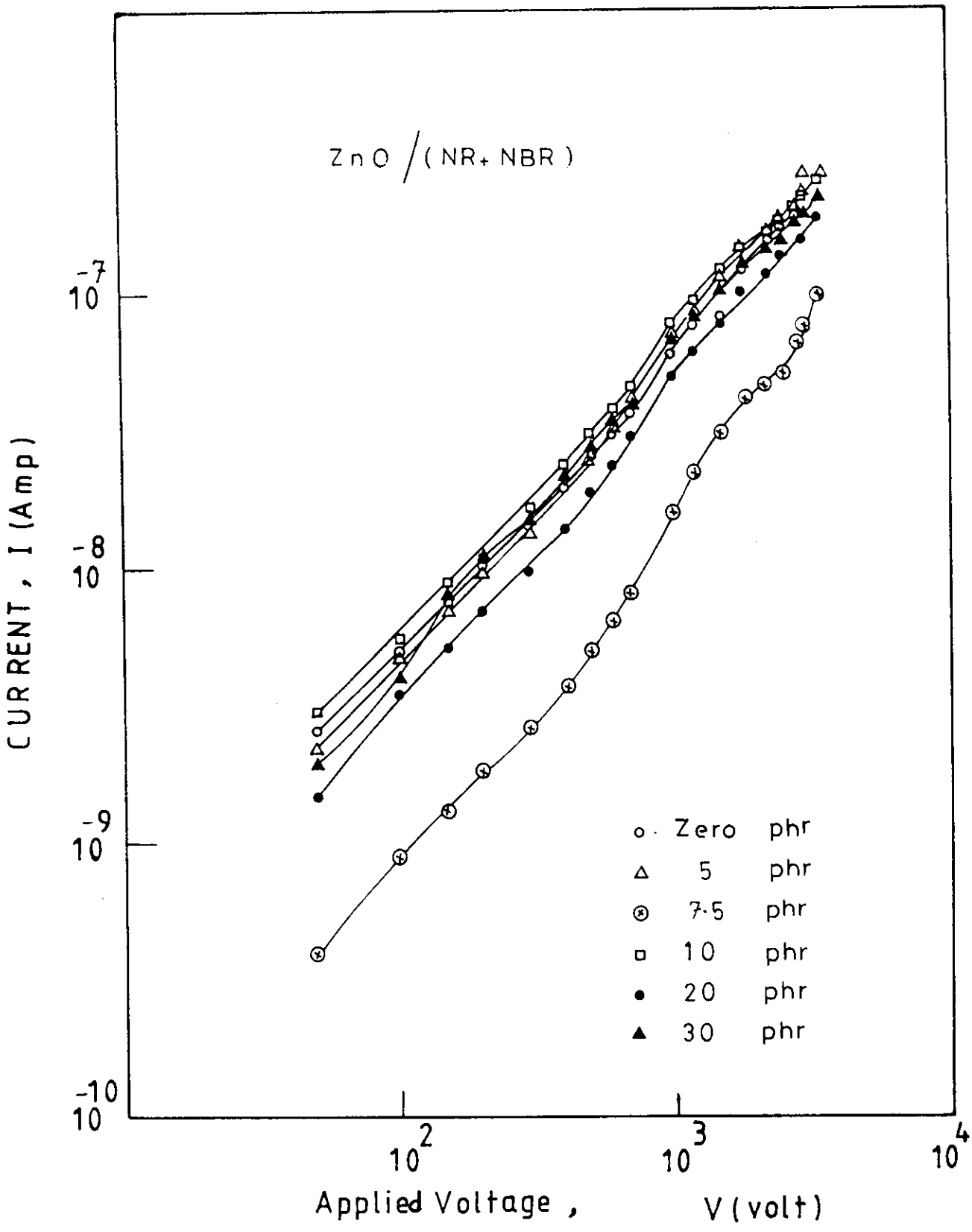
ZnO / (NR+ NBR)
CURRENT , I (Amp)
10^{-7}
10^{-8}
10^{-9}
10^{-10}
10^{2}
10^{3}
10^{4}
Applied Voltage , V (volt)
o Zero phr
△ 5 phr
⊗ 7·5 phr
□ 10 phr
● 20 phr
▲ 30 phr

Figure (3-10)

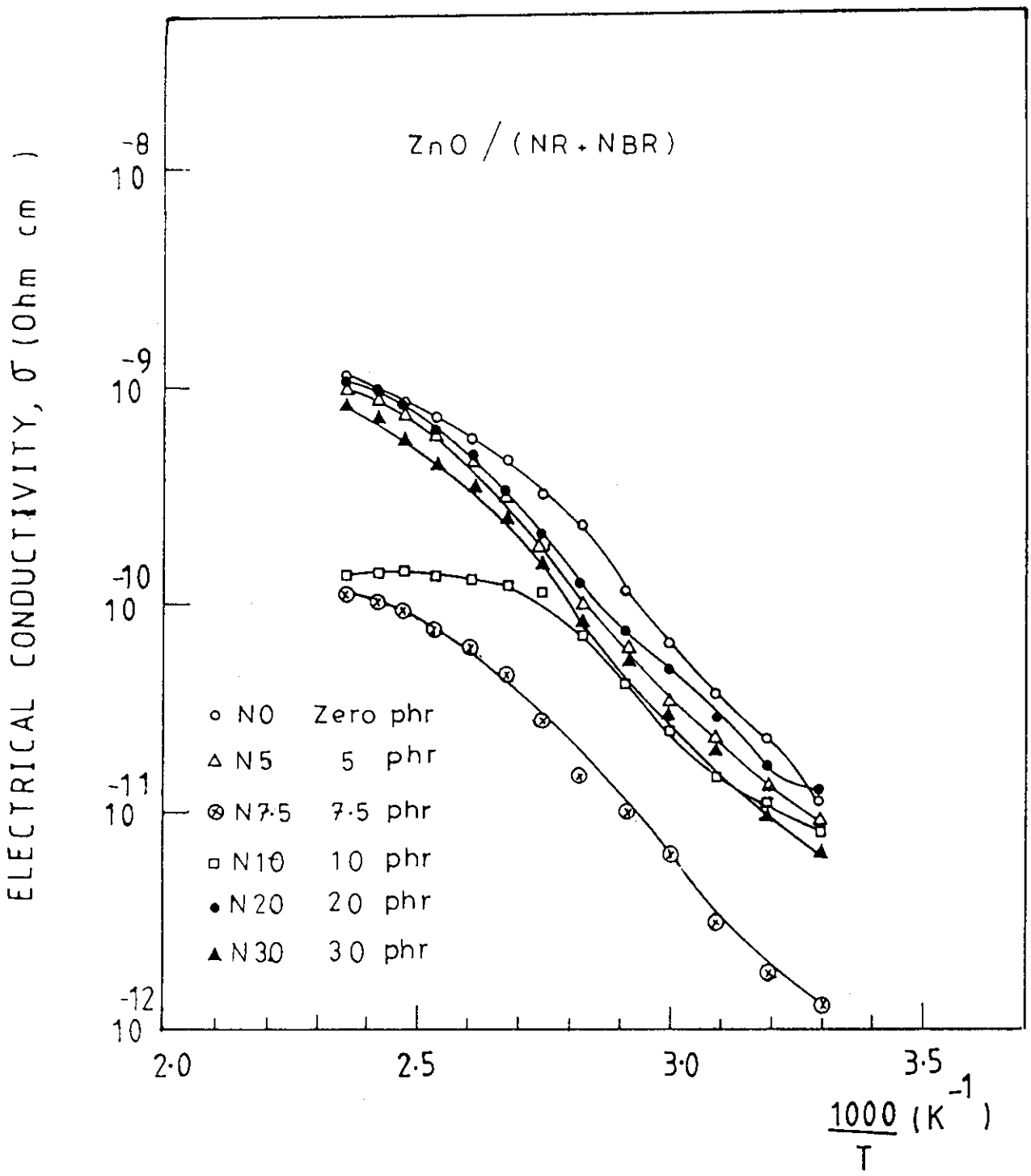
ZnO / (NR + NBR)
ELECTRICAL CONDUCTIVITY, σ (Ohm cm)
-1 -1
10^-8
10^-9
10^-10
10^-11
10^-12
2·0
2·5
3·0
3·5
1000/T (K^-1)
N0 Zero phr
N5 5 phr
N7·5 7·5 phr
N10 10 phr
N20 20 phr
N30 30 phr

Figure (3-II)

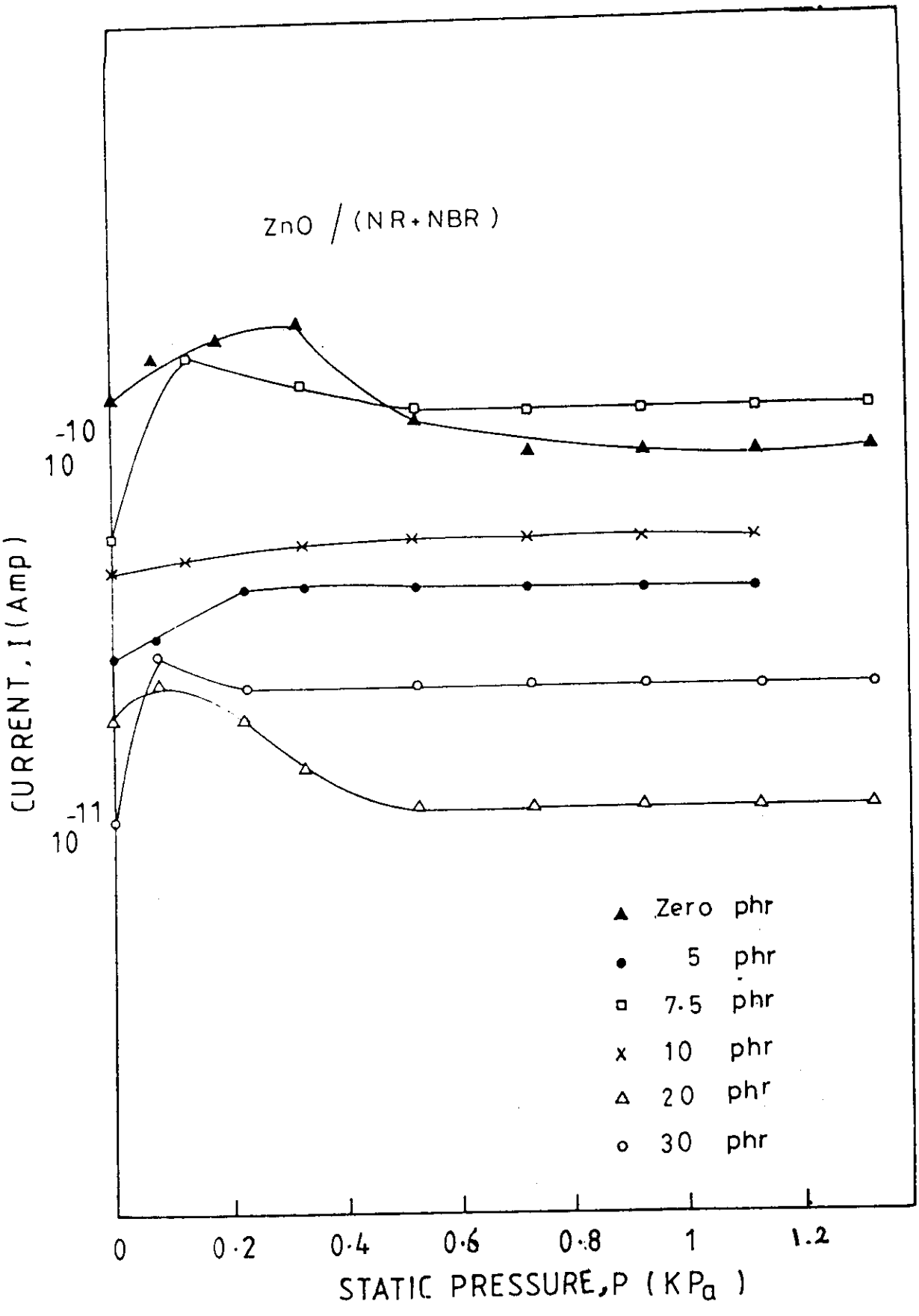
ZnO / (NR+NBR)
CURRENT, I (Amp)
10^{-10}
10^{-11}
Zero phr
5 phr
7.5 phr
10 phr
20 phr
30 phr
0
0·2
0·4
0·6
0·8
1
1.2
STATIC PRESSURE, P (KPa)

Figure (3-I2)

the effect of ZnO concentration on the degree of swelling of (NR+NBR) rubber composites. Figure3·13 shows the dependence of maximum swelling in kerosene of (CR+NBR) blends on the concentration of zinc oxide. It shows that the maximum swelling decreases with increasing the concentration of ZnO , and the charactristic concentration equals 14.4.

3.2.2 Effect of carbon back on electrical conductivity :

Figure 3·14 illustrates the temperature dependence of conductivity of samples containing different concentrations of FEF carbon black at constant concentration of znic oxide (7.5 phr).

It was found that samples containing low concentration of black (20 phr) showed thermally activated behaviour. The increase of carbon black concentration shows negative temperature coefficient conductivity at higher concentration of black.

Figure 3·15 shows the dependence of maximum swelling on the concentration of FEF carbon black, It shows that the decrease of swelling with increasing of concentration of FEF carbon black and the charactristic concentration C equals 64.2. The effect of static pressure on the conduction current of the samples is shown in figure 3.16 . It shows that at low concentration of FEF carbon black up to 40 phr, current decrease with increasing static pressure. This due to break down in the carbon black particles. For higher concentration of carbon black, conduction the current increases at low pressure region, while at high pressure region, the conduction current

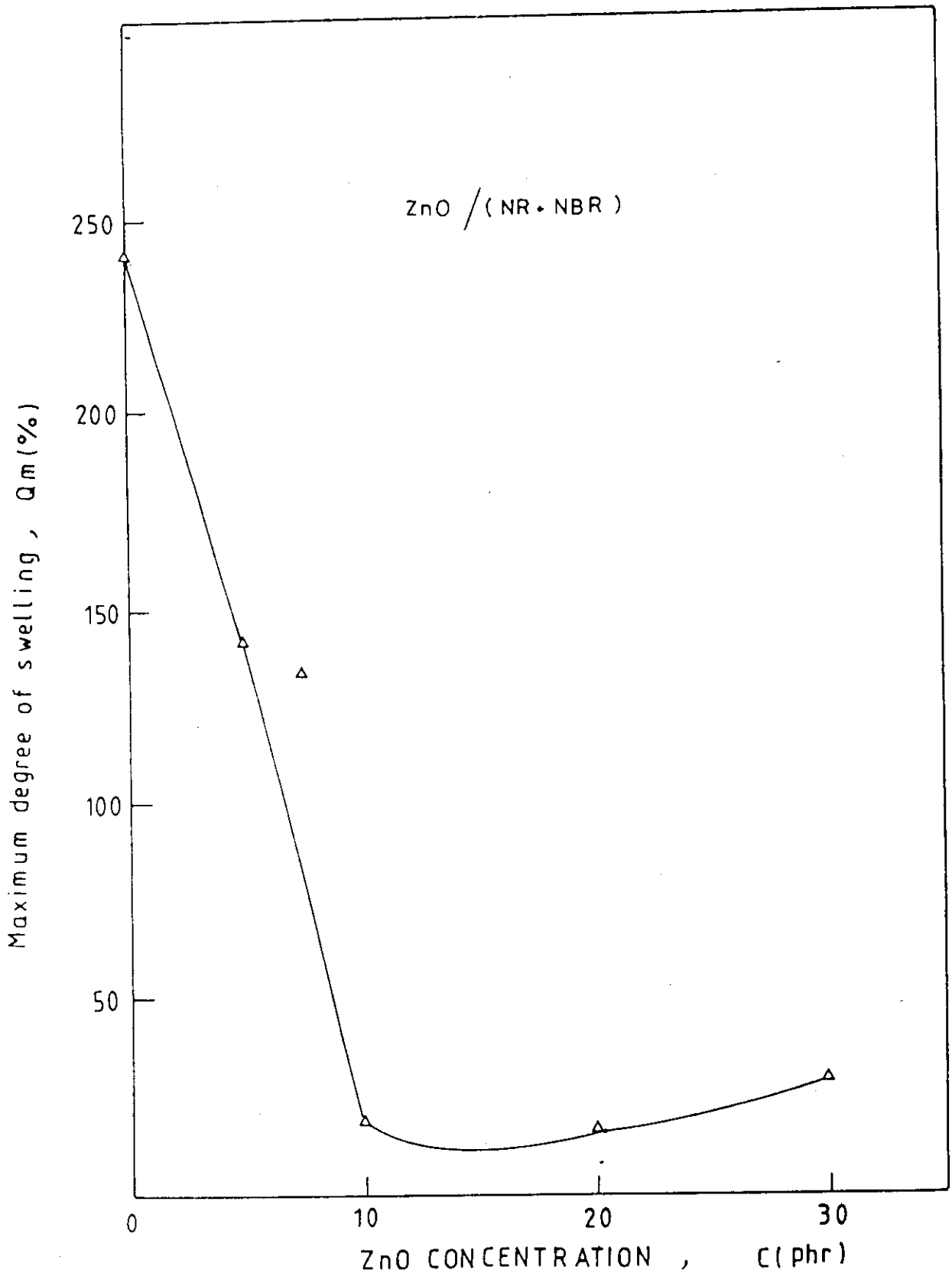
ZnO / (NR • NBR)
250
200
150
100
50
Maximum degree of swelling , Qm(%)
0
10
20
30
ZnO CONCENTRATION , C(phr)

Figure (3-I3)

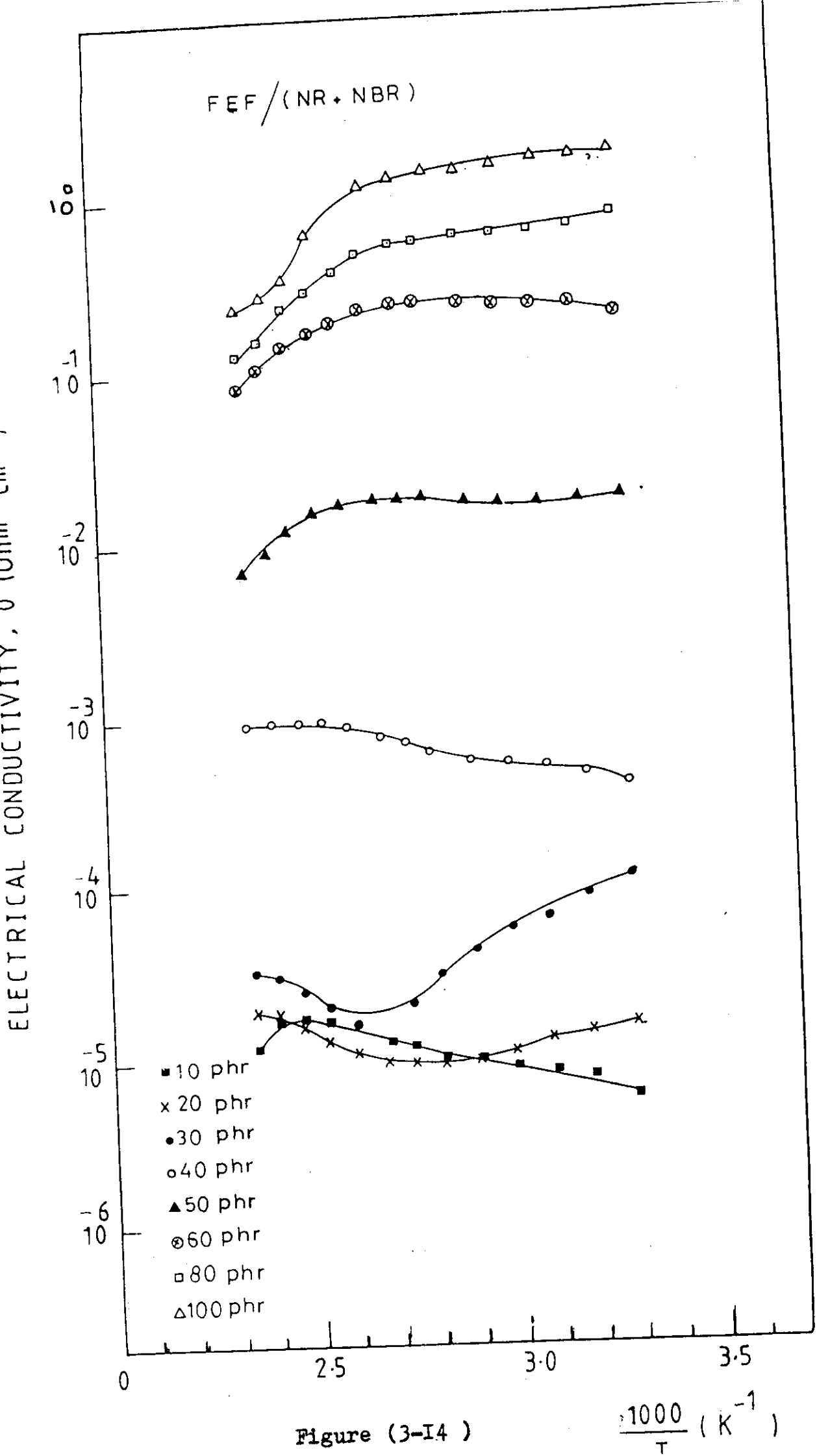
FEF / (NR + NBR)
ELECTRICAL CONDUCTIVITY, σ (Ohm⁻¹ cm⁻¹)
10 phr
20 phr
30 phr
40 phr
50 phr
60 phr
80 phr
100 phr
2·5
3·0
3·5
1000/T (K⁻¹)

Figure (3-I4)

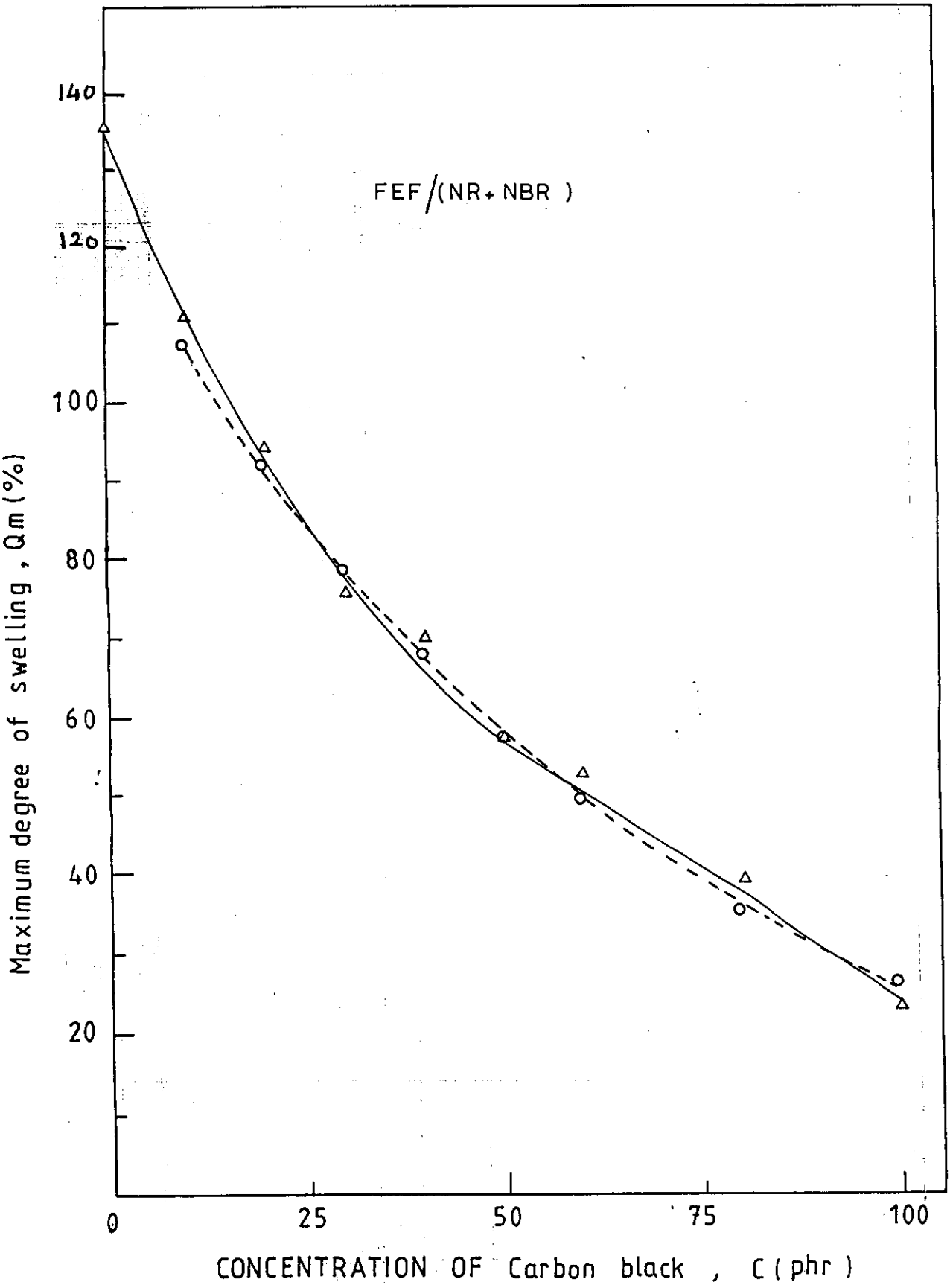
FEF/(NR+NBR)
140
120
100
80
60
40
20
0
25
50
75
100
Maximum degree of swelling, Qm (%)
CONCENTRATION OF Carbon black, C (phr)

Figure (3-I5)

is independent on pressure applied. The variation of pressure coefficient of conductivity with carbon black concentration is shown in table (3.5).

Table (3.5) Effect of pressure coefficient of conductivity on carbon black concentration.

Carbon black concen. phr	10	20	40	80	100
$\gamma\ (KPa)^{-1}$	-1.5	-0.6	-1.14	1.49	2.93