An Introduction to Tellurite Glasses

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Module 5 – Optical Properties

Part 5 : Optical Properties of Tellurite Glasses

- Linear & Non linear Optical Properties of Tellurite Glasses,
- Optical Properties of Tellurite Glasses in the Ultraviolet Region
- Infrared & Raman Spectra of Tellurite Glasses.

Linear & Non linear Optical Properties of Tellurite Glasses

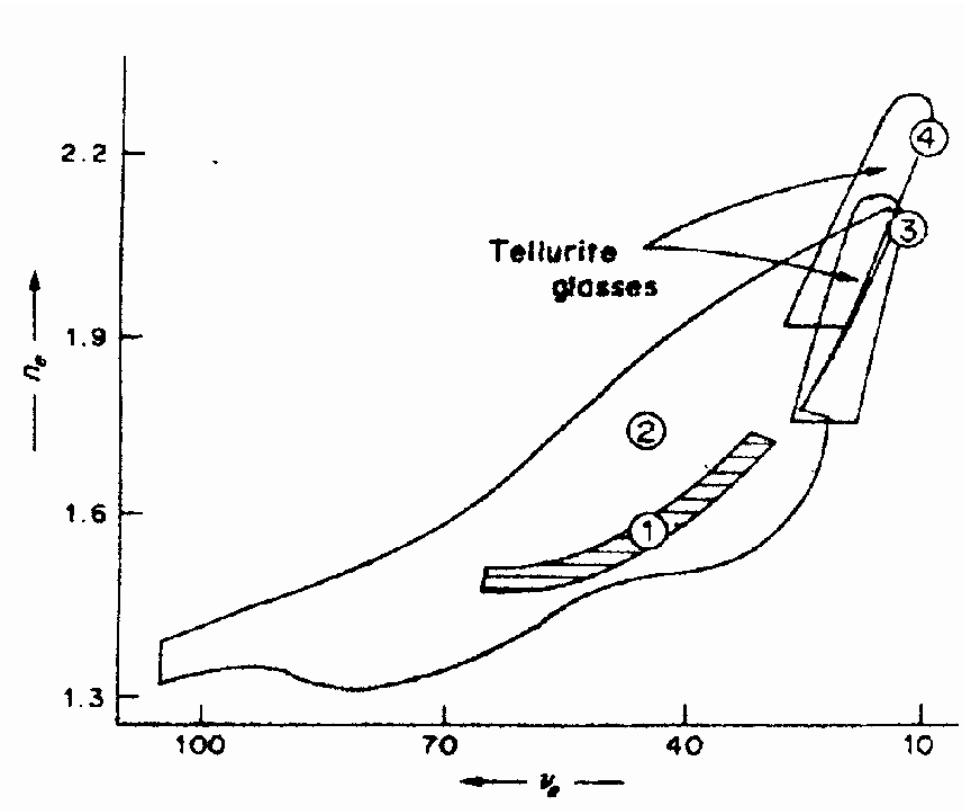
The linear & on linear refractive indices and dispersion values were collected for most of tellurite glasses at different wavelengths,

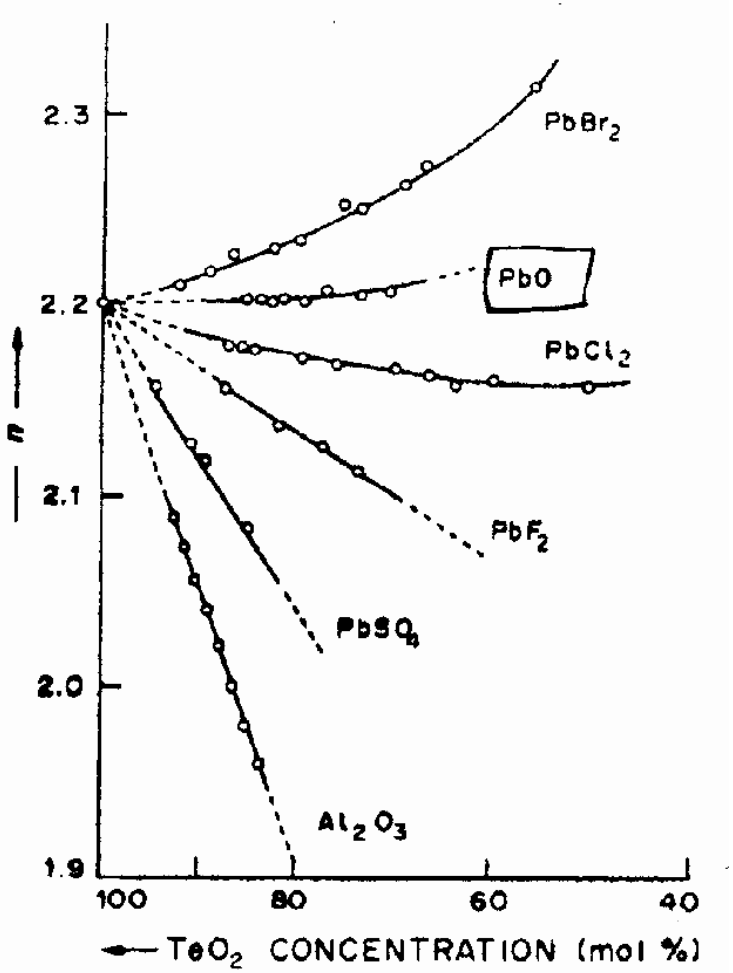
The relationship between the refractive index and number of ions /unit volume (N/V) with the values of the polarizability) α (have been represented*,*

The reduced number of polarizable ions per unit volume was primarily responsible for the reduction in both dielectric constant and refractive index, although reductions in electronic polarization also affected the optical properties,

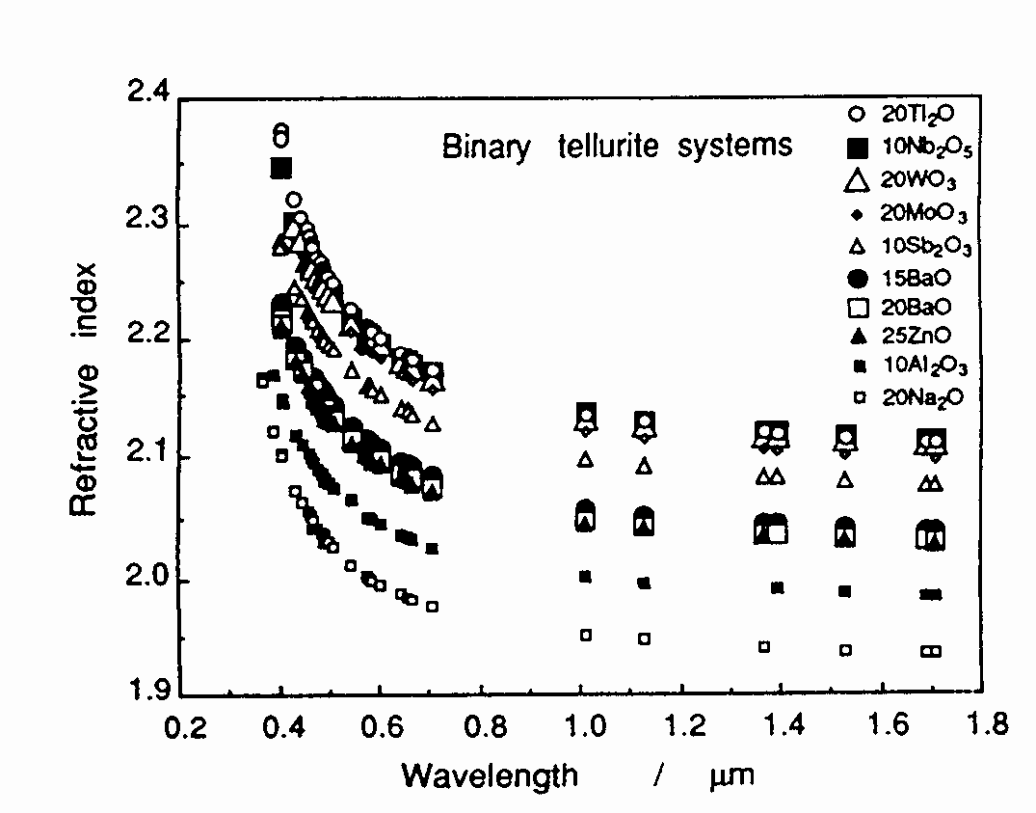
The refractive index, density, Thermal luminescence TL have been represented.

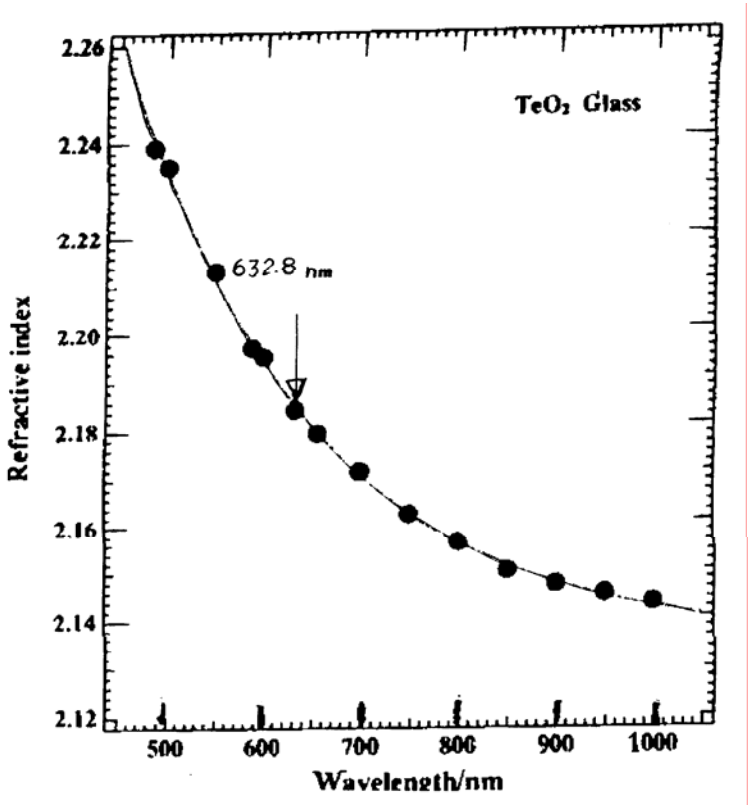
The linear refractive indices and dispersion values were collected for most of tellurite glasses at different frequencies, by Burger et al (1985)



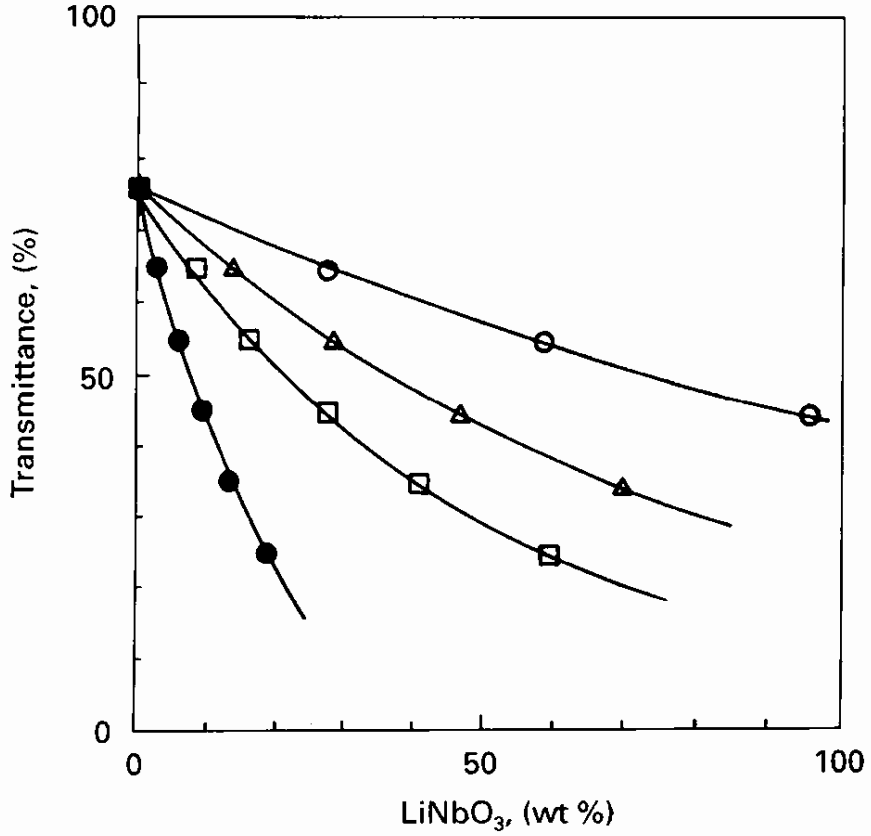


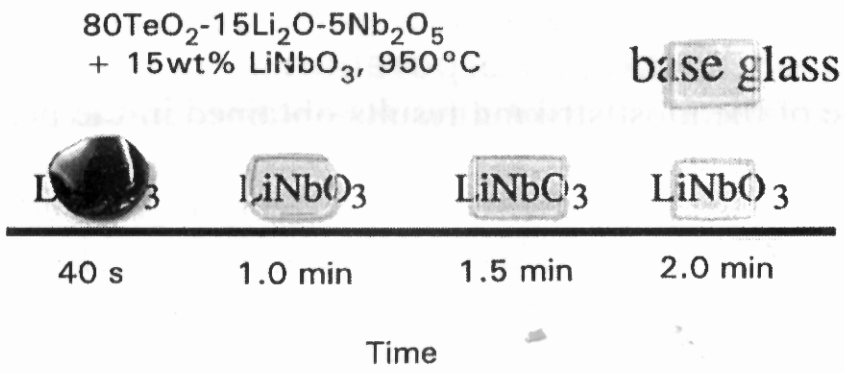
The linear refractive indices and dispersion values were collected for most of tellurite glasses at different frequencies, by Tanaka (1994) and Kim (1993)



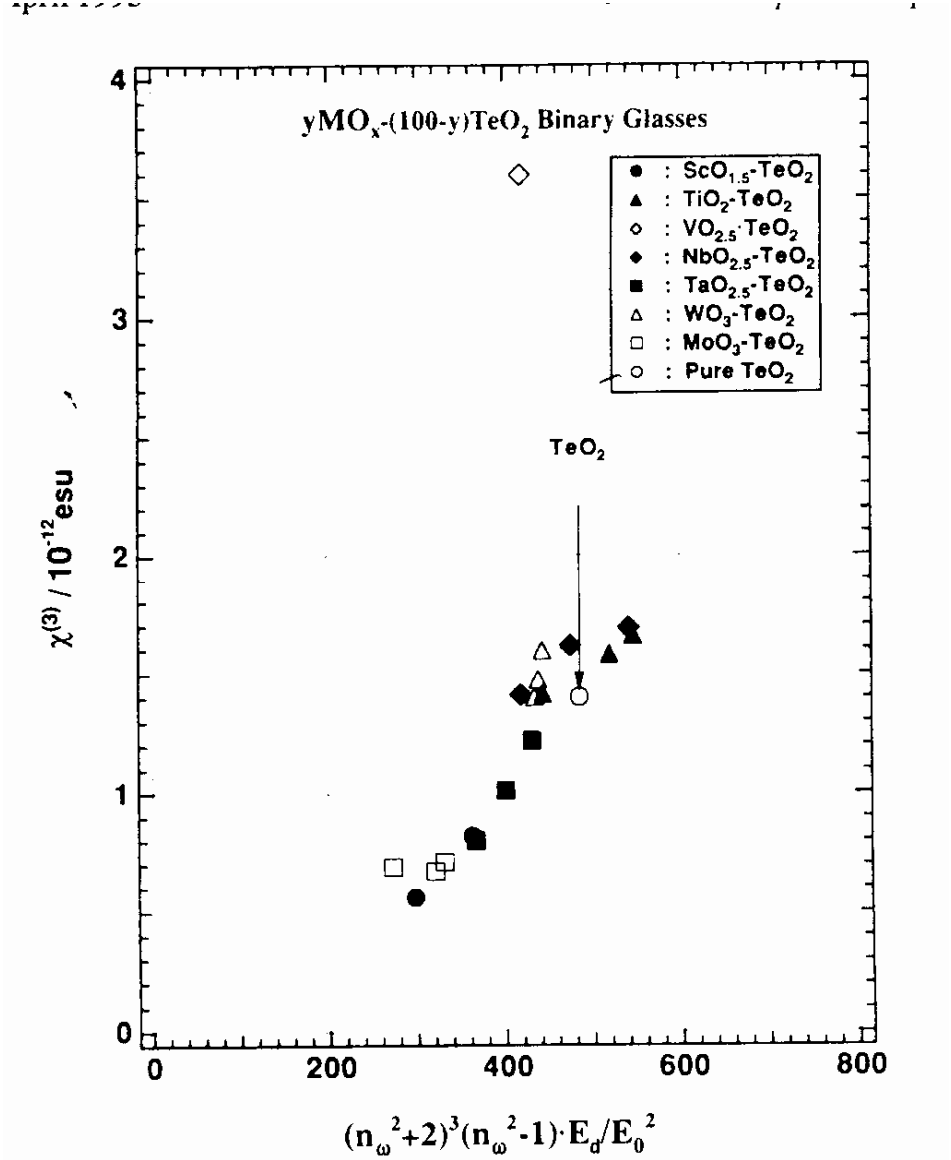


Temperature effect on the transparency of tellurite glasses TeO2- Li2O-Nb2O5 by Kim et al (1996)





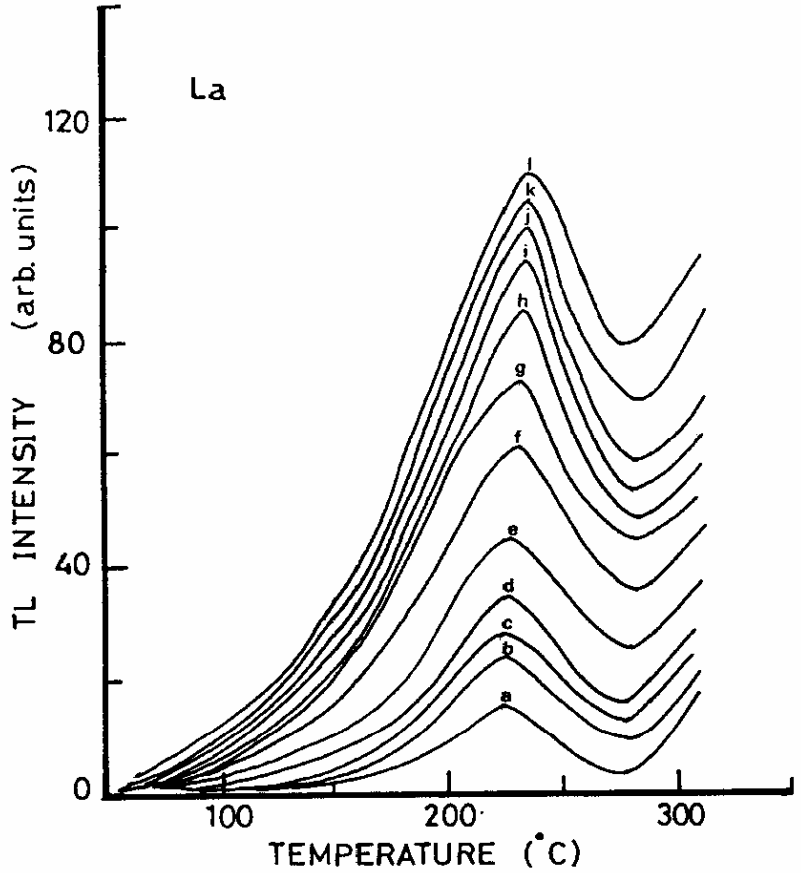
Non linear refractive indices of Tellurite Glasses TeO2- MOx glasses By Kim et al (1995)



Optical applications of oxide tellurite glasses

The values of figure of merit of ternary tellurite TeO2-WO3Li2O glasses as measured by Izumitani T. and Masuda I., (1974) from 15 to 18x10-18 (Sec3/g)

The thermo luminescence (TL) of rare earth tellurite- phosphate glass by Abdel-Kader, El-Mallawany R., et al, (1994)

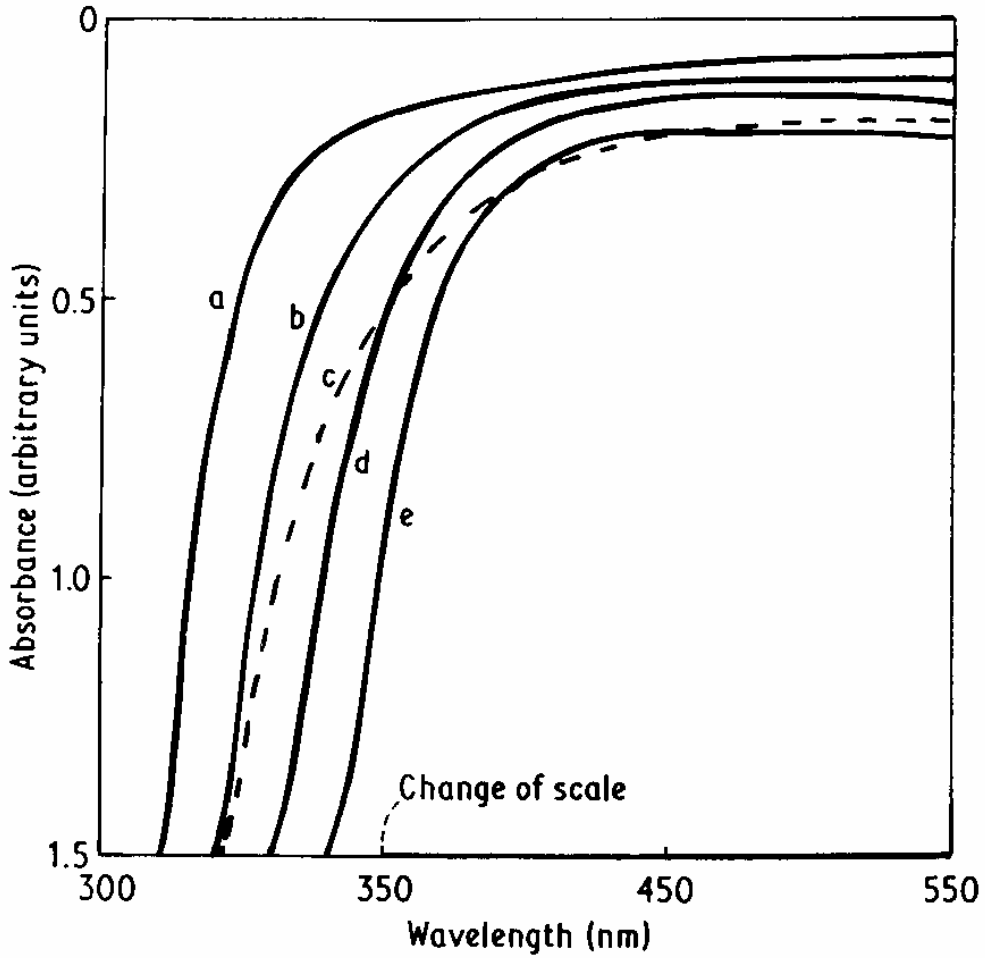


Optical Properties of Tellurite Glasses in the Ultraviolet Region,

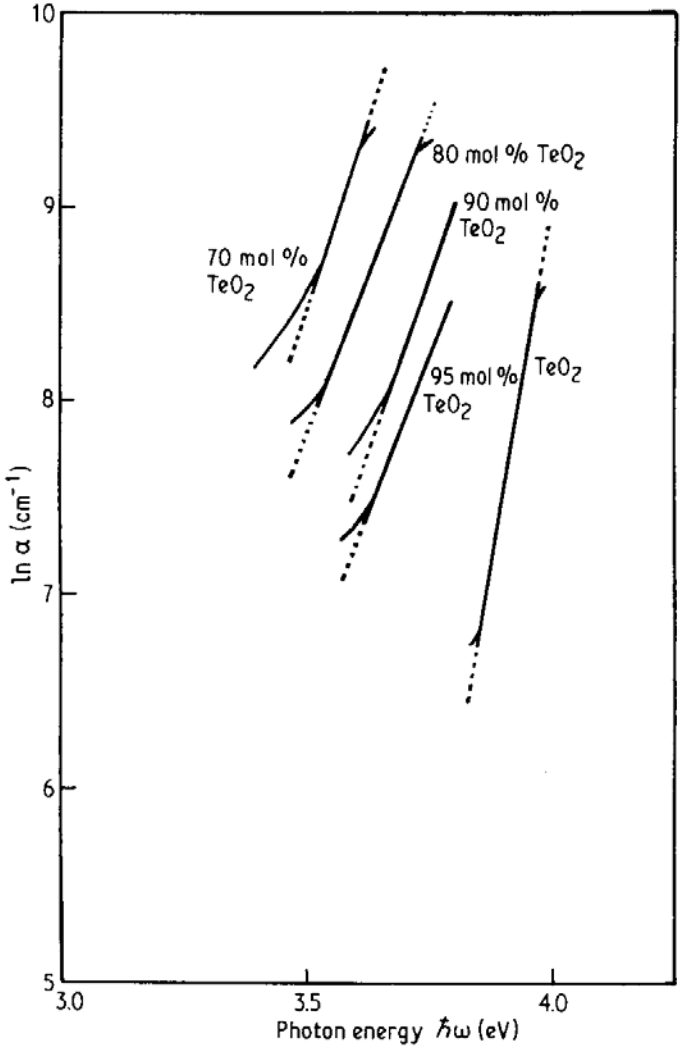
- The UV spectra (absorption, transmission) of tellurite glasses were collected in the spectrum range 200 – 600 (nm) at room temperature. Data of the UV-Properties of tellurite glasses have been represented,

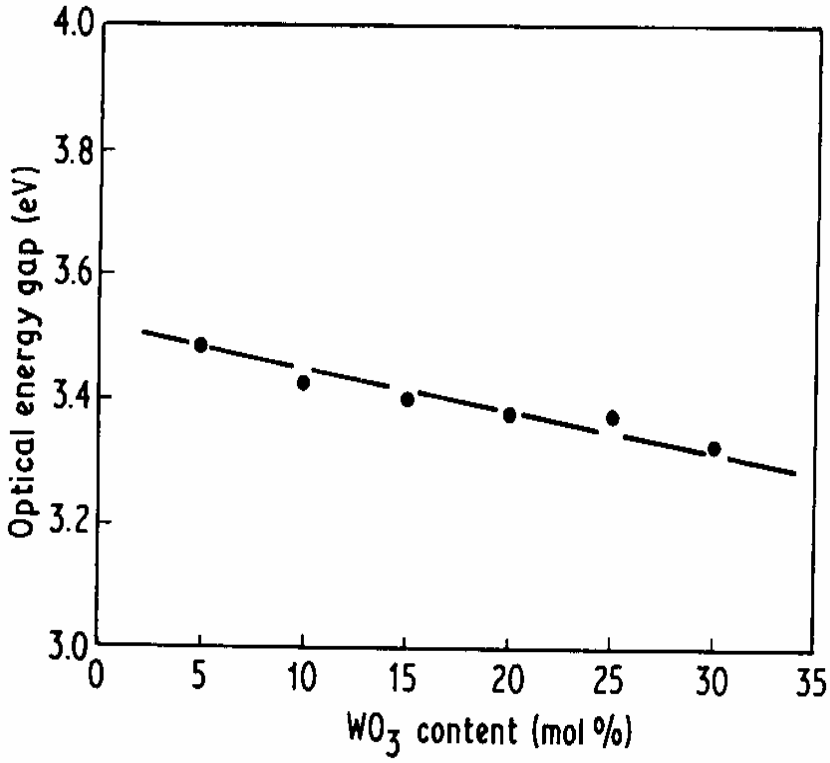
- From the experimental absorption spectrum, the energy gap and the band tail have been gathered for these glasses. Analysis of these optical parameters have been done according the Urbach rule.

The UV spectra (absorption, transmission) of tellurite glasses were collected in the spectrum range 200 – 600 (nm) at room temperature for TeO2-WO3 glasses by Ani et al (1985)



Analysis of these of the UV absorption edge for TeO2-WO3 glasses by Ani et al (1985)

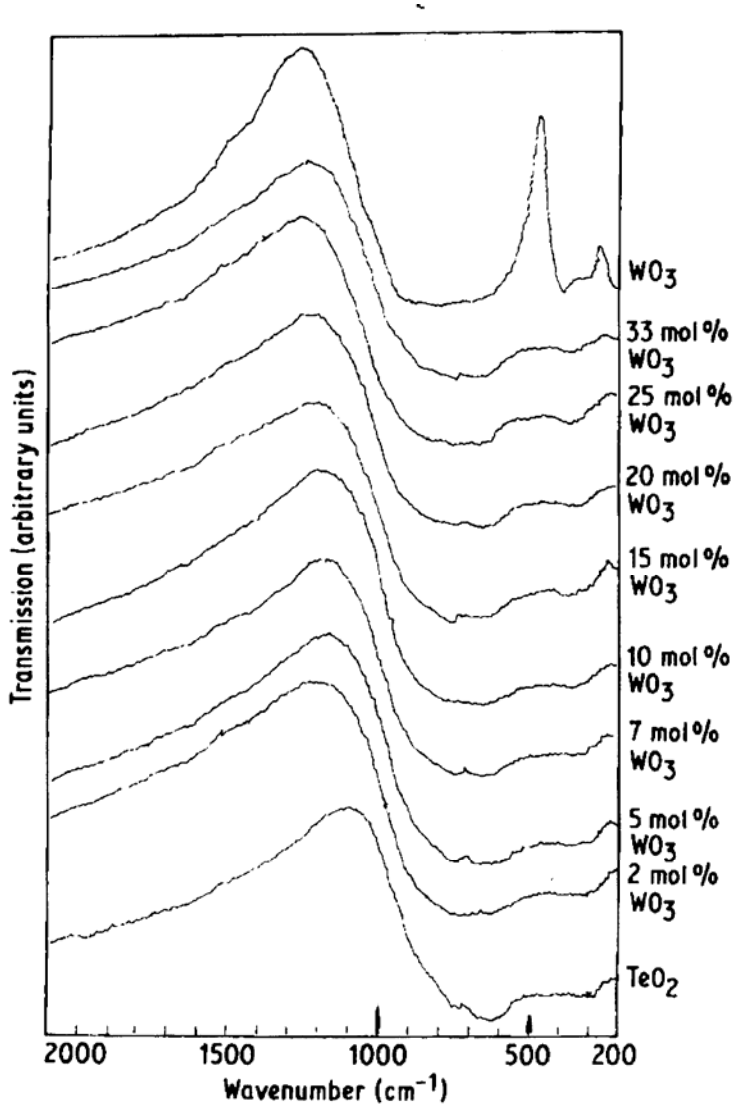




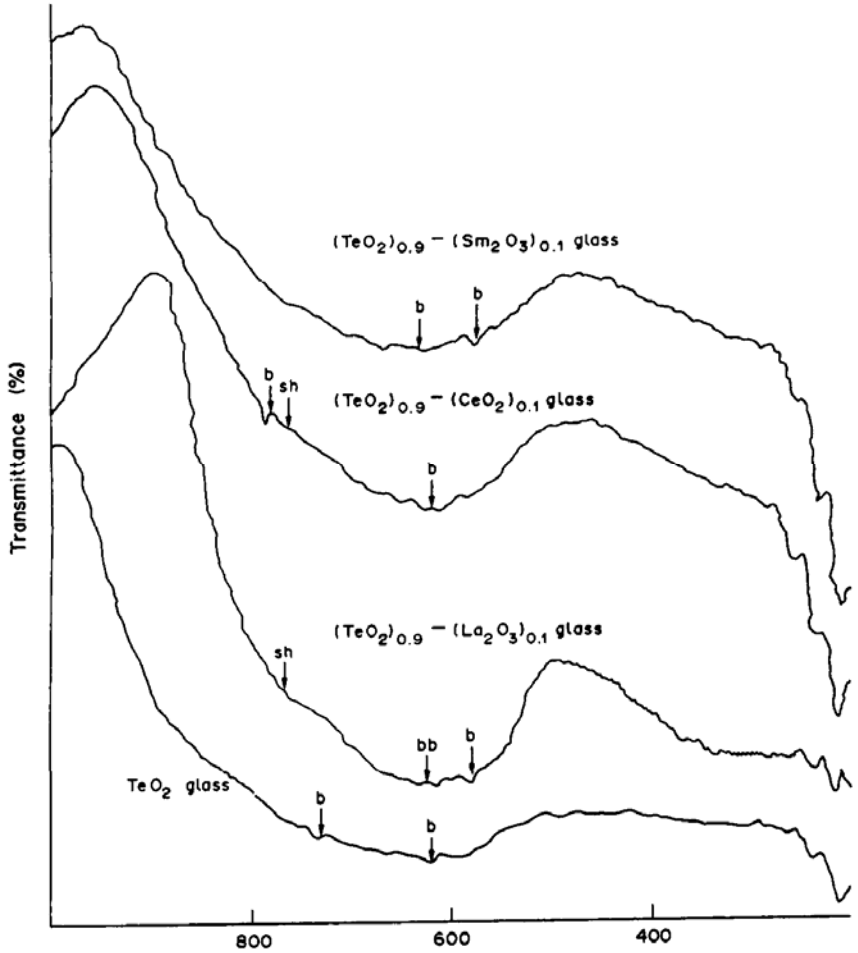
Infrared & Raman Spectra of Tellurite Glasses.

- The present section will gather two complementary techniques for characterization of glasses : IR & Raman spectroscopy. These non-destructive techniques provide extensive information about the structure and vibrational properties of glasses.
- The quantitative interpretation of the absorption bands of the IR spectra according to the value of the stretching force constant and reduced mass of the vibrating cation-anion has been discussed. Interpretation of the IR absorption curves shown that co-ordination number determines the chief form of the spectra.

Infra red absorption spectra of TeO2- WO3 glasses By Ani et al (1985)

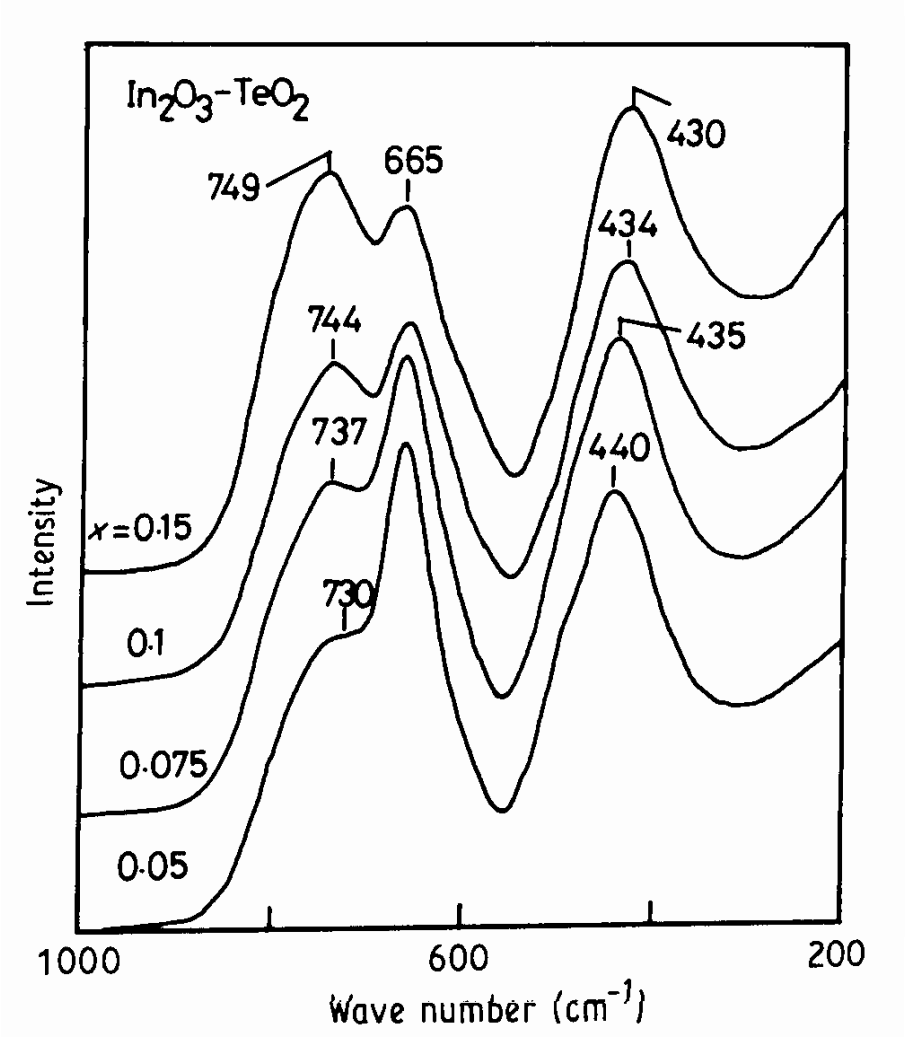


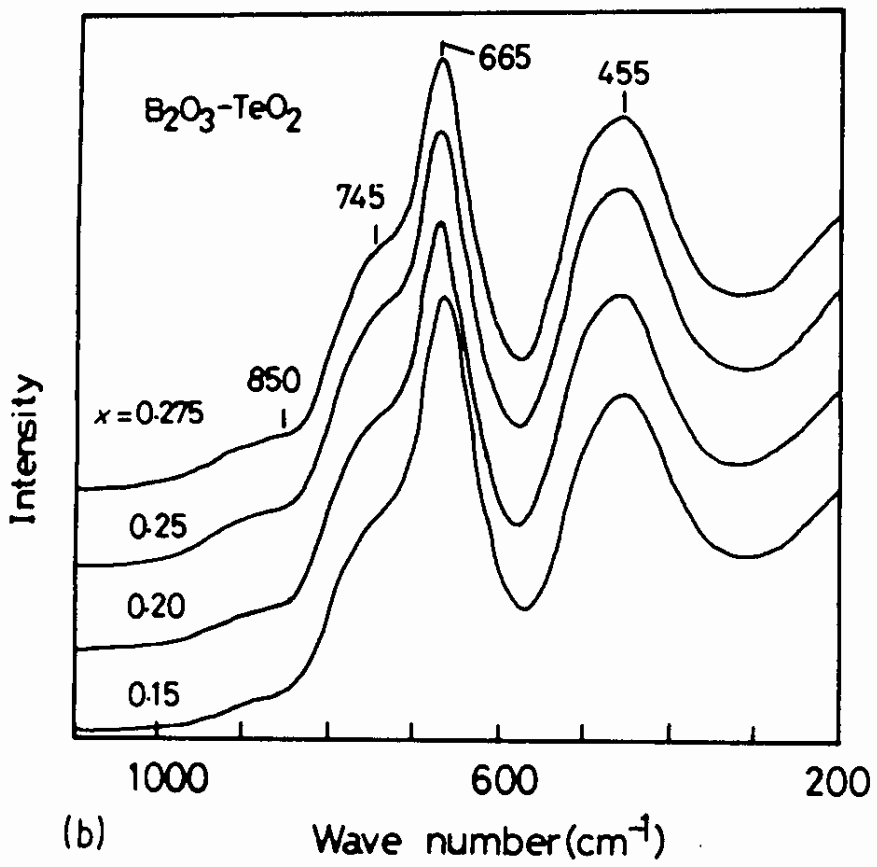
Infra red absorption spectra of R.E. Tellurite glasses by El-Mallawany (1989)



The quantitative analysis of optical properties in telluirte glasses are in reference http://www.crcpress.com/engineering/Chemical/T , (2002)

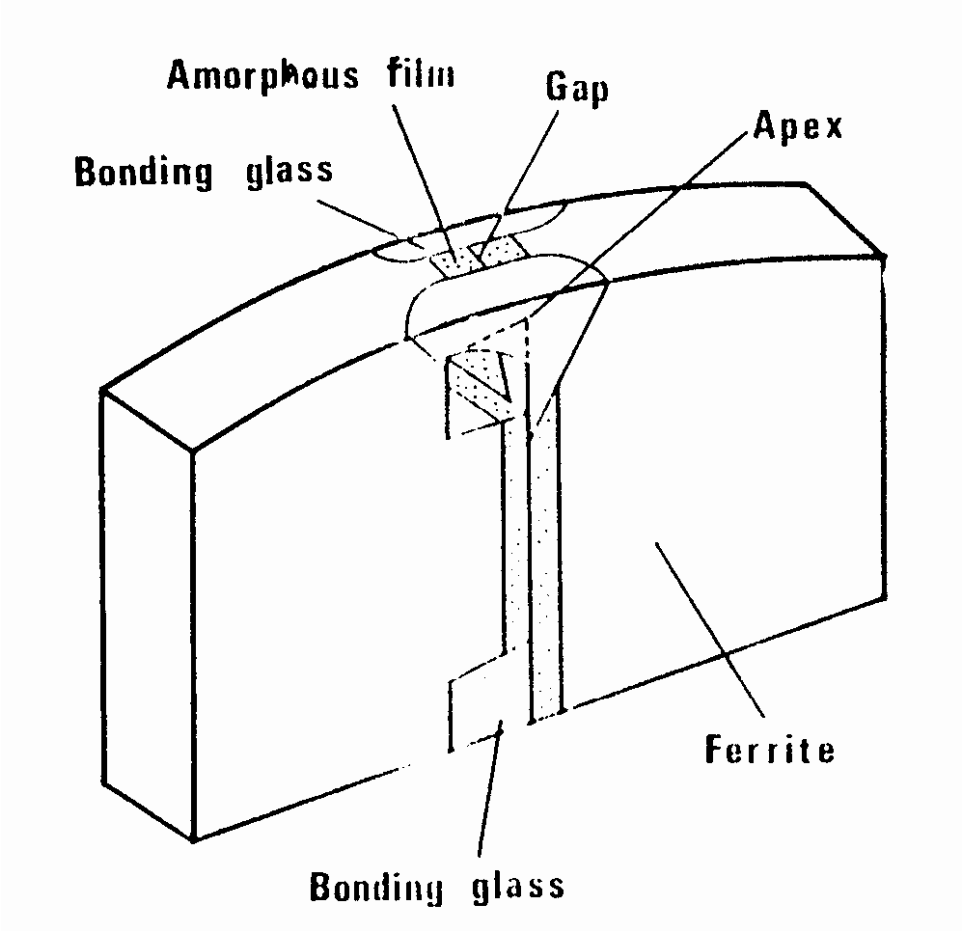
Raman spectra of binary tellurite glasses by Rong et al, (1992)





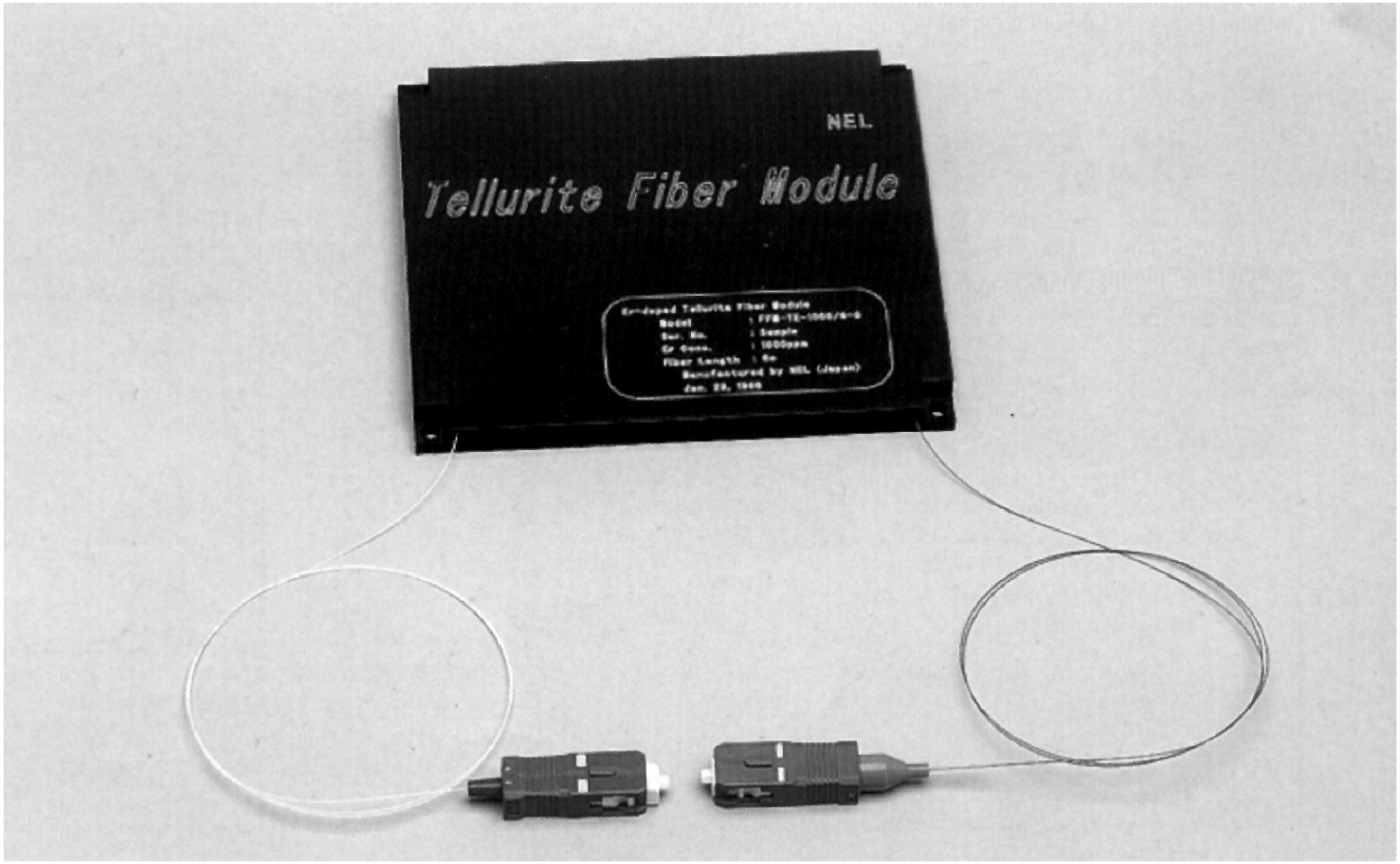
Applications of Tellurite Glasses

The use of tellurite glass as a bonding glass and the structure of the metal in gap (MIG) recording head by Mizuno Y., et al (1992)

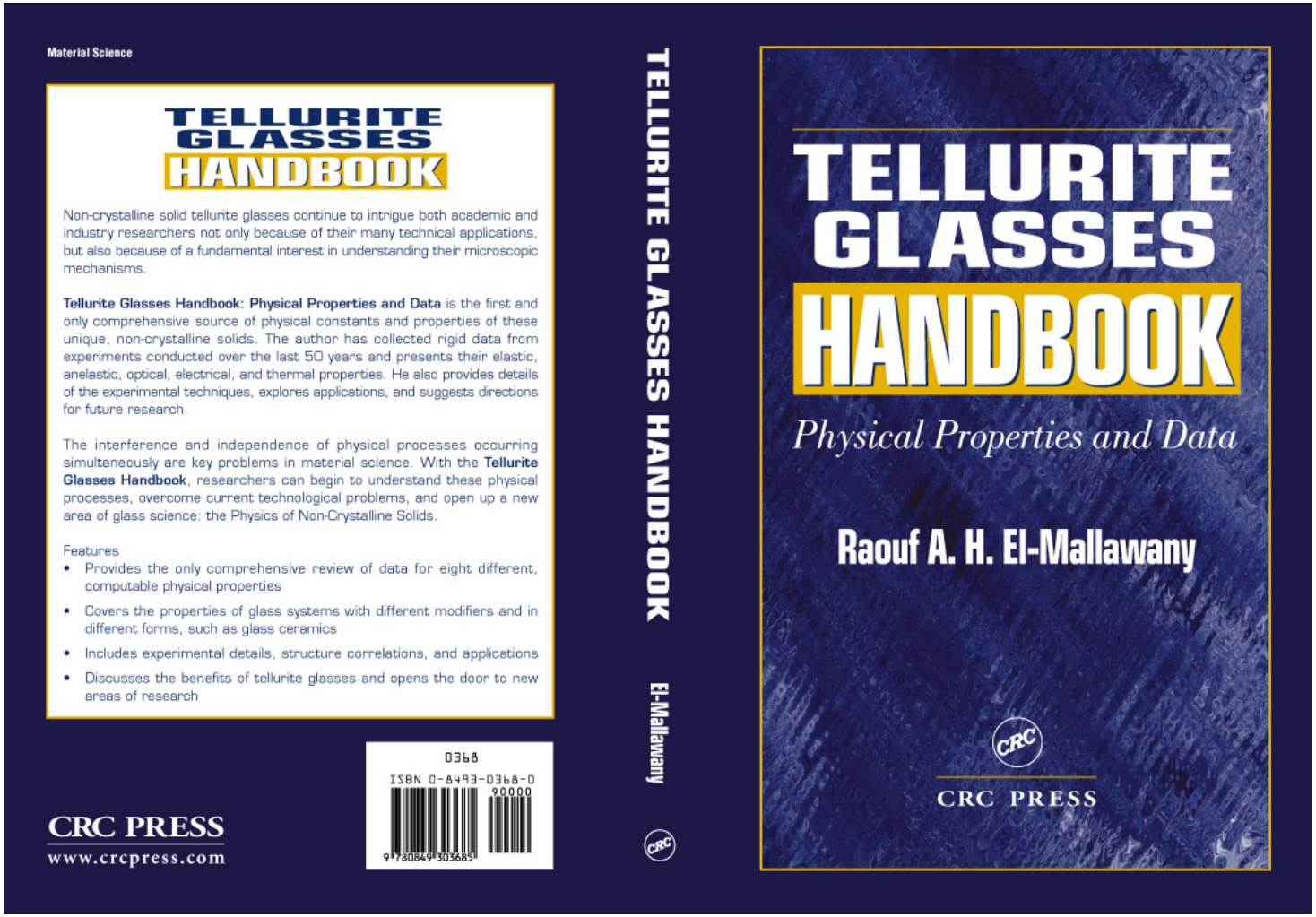


Applications of Tellurite Glasses

Photo of the tellurite fiber module by NEL electronics in Japan With permission



http://www.crcpress.com/engineering/Chemical/T ISBN: 0849303680 (2002)



I hope that you forgive me
for not including the whole international
data of tellurite glasses.

Tellurite glasses are of interest for
both scientific and technological viewpoints,
due to their unique and promising
physical properties.

Thank You

R.ElMallawany