An Introduction to Tellurite Glasses

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Module 1 -Tellurite Glass Introduction

Acknowledgment

I'd like to thank NSF's International Materials Institute (IMI) for New Functionality in Glasses for inviting me to visit:

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Department of Materials Science and Eng., Lehigh University, Pennsylvania.

Minufiya


Mediterranean Sea
West Bank
Gaza Strip
Dead Sea
Damietta
Port Said
Alexandria
Marsá Maṭruḥ
Ṭanṭā
Suez Canal
ISRAEL
JORDAN
Al Jīzah
CAIRO
Suez
Sinai
Sīwah
Banī Suwayf
SAUDI ARABIA
Al Minyā
Sharm ash Shaykh
Al Ghardaqah
LIBYA
Asyūt
Nile
Būr Safājah
Red Sea
Al Khārijah
Luxor
Aswan
Lake Nasser
Ḥalā'ib Triangle
0 100 200 km
0 100 200 mi
SUDAN

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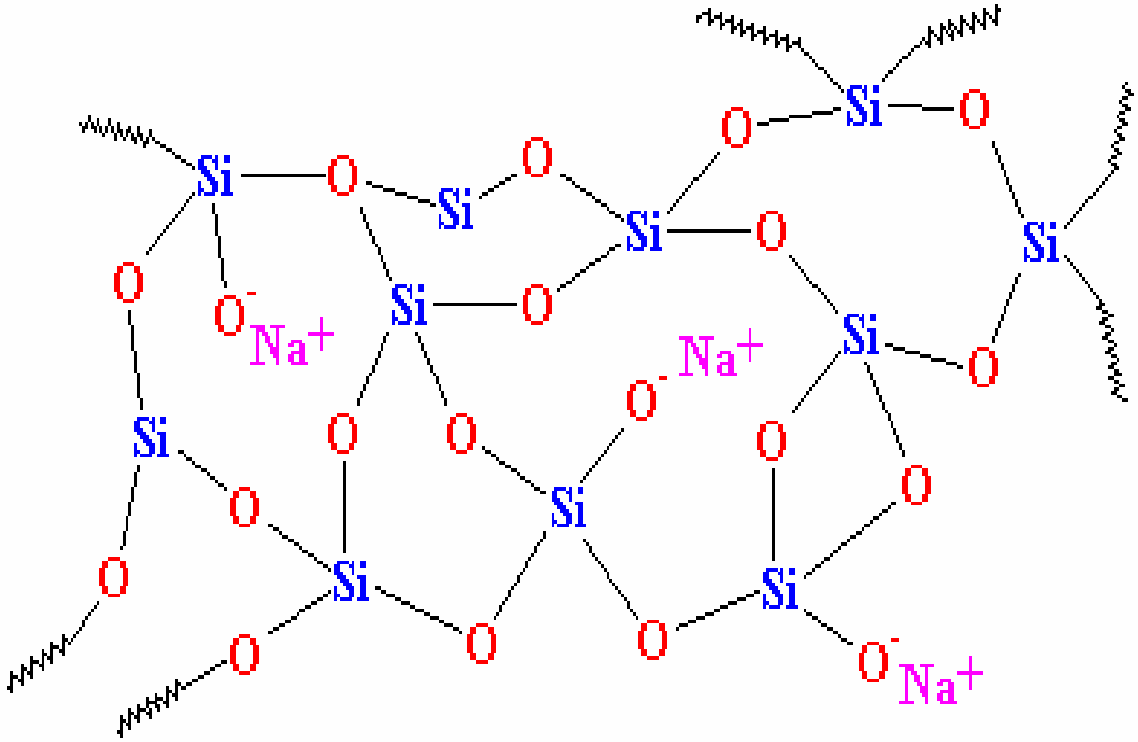
http://www.menofia.edu.eg/en/index.asp

What is Glass ?

Glass is a solid materials in a random distribution



Features of Glass

Glass has excellent features in a wide range of fields as shown below:

- ***Optically homogeneous and transmits light well,***
- ***Excellent solid solvent into which nearly all elements can be melted to produce diverse materials,***
- ***Various shapes can be easily formed,***
- ***Excellent strength, hardness and chemical durability,***

- ***Various functions can be provided by surface treatment and other means.***
- ***Physical properties can be changed by modification processing such as crystallization and phase separation.***
- ***Various functions and physical properties can be finely adjusted.***

What are new glasses ?

The New Glasses are spotlighted as the most promising materials in diverse high technology fields such as :

- ***Electronics,***
- ***Information Processing & Communications,***
- ***Space & Ocean Development,***
- ***Energy,***
- ***Biotechnology & medical Science.***

International attention of Telluirte Glasses*

up to Dec.2005 using ISI

- 1950's to 1970's : Few
- 1980's: about 10's
- 1990's: About 200
- 2000-2004: About 360
- 2005 : = 100
- 2006: 7 articles regarding Up conversion, Ultrasonic studies,

  Spectral properties (fluorescence, Luminescence,….) containing R.E.Oxides like Er, Tm, Sm, and T.O. like V & W)

* Only Oxide Tellurite glasses and mainly in the bulk form

Preparation of Tellurite Glasses

- Mixing of components
- Melting of the mixture
- Quenching
- Annealing

Melting of the mixture

Quenching

Annealing

Samples of Tellurite Glasses

To Be Followed by

Module 2: Tellurite Glass History