

**THERMAL STABILITY AND STRUCTURAL STUDIES IN THE
TeO₂-ZnO-MgO-Li₂O-Er₂O₃ GLASS SYSTEM**

Sulhadi, M. R. Sahar, M. S. Rohani and R. Arifin

*Advanced Optical Material Research Group, Faculty of Science,
Universiti Teknologi Malaysia, 81310 Skudai, Johor DT-Malaysia*

ABSTRACT

Series of (80-x)TeO₂-18ZnO-1MgO-1Li₂O-xEr₂O₃ glass system (0.5mol% ≤ x ≤ 2.5mol%) has successfully been made by melt quenching technique. The thermal stability and structure of glass has been investigated by means of TG/DTA and FTIR spectroscopy. The thermal parameters, such as the glass transition temperature (T_g), crystallization temperature (T_c) and thermal stability (T_c-T_g) were determined. It is found that this system provides a wide and stable glass formation in which the glass stability around 97°C-117°C may be obtained. The broad absorption peaks were observed around 657cm⁻¹-671cm⁻¹ and 755cm⁻¹-758cm⁻¹, which correspond to the stretching vibration mode of TeO₄ tetrahedron and TeO₃ triangle, respectively. The absorption peaks around 1600cm⁻¹ and 3400cm⁻¹ are assigned to a stretching vibration of the hydroxyl group participating in the strong metal and hydrogen bonding respectively.

<http://journal.masshp.net/wp-content/uploads/Journal/2007/Jilid%201/Sulhadi%20116-121.pdf>

REFERENCES

- [1] El-Mallawany, R. (2002); Tellurite Glasses Handbook: Physical Properties and Data; CRC Press LLC.
- [2] Nukui, A. Taniguchi, T. Miyata, M. (1995); J. Non-Cryst. Solids 293-295, 255.
- [3] Sahar, M.R. Noordin, N. (1995); J. Non-Cryst. Solids 184, 137.
- [4] Bürger, H. Kneipp, K. Hobert, H. Vogel, W. (1992); J. Non-Cryst. Solids 151, 134.
- [5] Neindre, L.L. Jiang, S. Hwan, B.C. Luo, T. Watson, J. Peyghambarian, N. (1999); J. Non-Cryst. Solids 255, 97.
- [6] Sidebottom, D.L. Hruschka, M.A. Potter, B.G. Brow, R.K. (1997); J. Non-Cryst. Solids 222, 282.
- [7] Marjanovic, S. Toulouse, J. Jain, H. Sandmann, C. Dierolf, V. Kortan, A.R. Kopylov, N. Ahrens, R.G. (2003); J. Non-Cryst. Solids 322, 311.
- [8] Tastumisago, M. Minami, T. Kowada, Y. Adachi, H. (1994); Phys. Chem. Glasses 35, 89.
- [9] El-Moneim, A. A. (2002); Mater. Chem & Phys 73, 318.
- [10] Kawasaki, S. Honma, T. Benino, Y. Pujiwara, T. Sato, R. Komatsu, T. (2003); J. Non-Cryst. Solids 325, 61.
- [11] Sahar, M.R. Jehbu, A.K. Karim, M.M. (1997); J. Non-Cryst. Solids 213&214, 164.
- [12] Liu, H.S. Chin, T.S. Yung, S.W. (1997); Mater. Chem & Phys 50, 1.
- [13] Xia, H. Nie, Q. Zhang, J. Wang, J. (2003); Mater. Lett 4446, 1.
- [14] Hu, L. Jiang, Z. (1996); Phys. Chem. Glasses 37 [1], 19.
- [15] Nazabal, V. Todoroki, S. Nukui, A. Matsumoto, T. Suehara, S. Hondo, T. Araki, T. Rivero, C. Cardinal, T. (2003); J. Non-Cryst. Solids 325, 85.
- [16] Charton, P. Thomas, P. Armand, P. (2003); J. Non-Cryst. Solids 321, 81.
- [17] Li, H. Su, Y. Sundaram, S.K. (2001); J. Non-Cryst. Solids 293-295, 402.
- [18] Sekiya, T. Mochida, N. Ohtsuka, A. Tonokawa, M. (1992); J. Non-Cryst. Solids 144, 128.
- [19] Feng, X. Tanabe, S. Hanada, T. (2001); J. Non-Cryst. Solids 281, 48.