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Κύκλος Σεμιναρίων NANOTEΧΝΟΛΟΓΙΑ / ΝΕΑ ΥΛΙΚΑ

ΟΜΙΛΗΤΗΣ: **Dr. Doris Moncke**

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ΘΕΜΑ: **MnO-cluster formation and structural changes in borate and borosilicate glasses**

ΤΟΠΟΣ: Αίθουσα Σεμιναρίων ITE/IECHM

ΗΜΕΡΟΜΗΝΙΑ: **Δευτέρα, 8 Οκτωβρίου 2012**

ΩΡΑ: **12:00**

ΠΕΡΙΛΗΨΗ:

Low alkaline borosilicate (BS) and SrO-B₂O₃ metaborate glasses were doped with MnO. Doping levels in the BS glass series were restricted to 4 mol% where phase separation set in. Glasses with up to x=0.6 MnO were prepared in the xMnO-(1-x)(SrO-B₂O₃) glasses by rapid quenching. Exchange narrowing of the EPR signals indicates the formation of cluster containing edge or even face shared MnO₆-octahedra in both glass systems. MnO addition to low alkaline BS glasses, which are characterized by a fully polymerized network without the presence of non-binding oxygen ions, results in an increase in [BO₄]⁻ groups. However, instead of a better mixing between borate and silicate tetrahedra, concentrate [BO₄]⁻ groups preferentially as ligands around Mn-ions.



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With increasing MnO addition structural changes occurred in the highly over-modified borate glass series transforming the metaborate entities to pyroborate and later to orthoborate units. IR and Raman spectroscopy confirm for the sample with the highest MnO content the presence of $[B\emptyset_2O_2]^{3-}$ units (\emptyset denotes bridging, O non-bridging oxygen ions), which are an isomeric form of the trigonal $(BO_3)^{3-}$ groups. The presence of $[B\emptyset_2O_2]^{3-}$ units also explains the observed increase of the transition temperature T_g and the decrease of density for the last sample, which go against the general trend of these properties within the glass series.