XIV Liquid and Amorphous Metals Conference

Rome 11 - 16 july 2010
"Sapienza" - University of Rome

Synopsis

The 14th International Conference on Liquid and Amorphous Metals (LAM XIV) will be held at the University of Roma "La Sapienza", Italy, July 11-16, 2010. The conference aims to gather the wide community of scientists interested in liquid and amorphous metals and to provide the attendees with an up-to-date survey of progress in this intriguing field of the condensed matter physics.

The first conference of this longstanding cycle of events was held in Brookhaven (USA) as LM-1 in 1966. The next liquid metals conferences were held in Tokyo (1972) and Bristol (1976). The cycle was then renewed including topics on amorphous metals in Grenoble (1980), Los Angeles (1983), Garmisch-Partenkirchen (1986), Kyoto (1989), Wien (1992), Chicago (1995), Dortmund (1998), Yokohama (2001), Metz (2004) and Ekaterinburg (2007).

As in previous editions, the conference is devoted to liquid and amorphous metals, and to those non-metallic systems which are traditionally hosted within the program (semi-conductors, molten salts, quasicrystals, etc.). We are planning also focused sessions to explore new horizons in the field of liquid and amorphous materials, with special emphasis on those which can be tackled with emerging techniques. These include the development of advanced radiation sources (synchrotrons, neutrons) for measurements of structural and dynamical properties of liquid, amorphous and colloidal phases; perspectives offered by novel fourth generation soft and hard x-ray sources for metals under extreme and/or highly metastable conditions; ultrafast techniques for studying phase transitions, chemical reactions and non-equilibrium states; ab-initio simulations of metals, alloys and nanosized systems.

The meeting will include single sessions of invited and selected contributing papers as well as dedicated poster sessions.

Tullio Scopigno
Dip. di Fisica - "Sapienza" Università di Roma
e-mail: tullio.scopigno@roma1.infn.it

Andrea Di Cicco
Dip. di Fisica - Università di Camerino
e-mail: andrea.dicicco@unicam.it

Committees

International advisory committee

K. Tsuji (Japan), P. Popel (Russia), J. Bermejo (Spain), W. C. Pilgrim (Germany), T. Scopigno (Italy), C. Dong (China), J. G. Gasser (France), A. Di Cicco (Italy), B. Gelchinski (Russia), D. L. Price (France), K. Tamura (Japan), P. Salmon (UK), P. Hausler (Germany), D. Gonzalez (Spain), K. Hoshino (Japan), M. Yao (Japan), M. Calvo-Dahlborg (France)

International programme committee

M. Mendelev (USA), P. A. Madden (UK), M. L. Saboungi (France), J. Morris (USA), V. Sidorov (Russia), A. P. Tsai (Japan), A. Mikula (Austria), D. Holland-Moritz (Germany), K. F. Kelton (USA), K. Khishchenko (Russia), A.C. Barnes (UK)

National organizing committee

L. Battezzati, M. Celino, S. De Panfilis, C. Masciovecchio, E. Principi, F. Sacchetti, A. Trapananti, G. Ruocco, A. Filipponi, G. Angilella, G. Aquilanti

Scientific secretariat

F. Lupinacci, P. Pasolini *(Gruppo Symposia S.R.L.)*

Graphic design

F. Medici

On relaxation processes in the Al-TM-REM melts

V. Lad`yanov[1,2], S. Menshikova[1,2], A. Bel`tyukov[1,2], M. Vasin[1,2], V. Maslov[3]

[1]Physical-Technical Institute, Ural Division, Russian Academy of Sciences, 132 Kirov Str., Izhevsk, 426000, Russia, las@pti.udm.ru
[2]Udmurt State University, Science Reseach Institute Termphysics of New Materials, 1 Universitetskaya Str., Izhevsk, 426034, Russia, svetlmensh@mail.ru
[3]G.V. Kurdyumov Institute of Metal Physics, National Academy of Sciences of the Ukraine, 36 Vernadsky's Avenue, Kiyev-142, UA-03680, Ukraine, maslov@imp.kiev.ua

In the present paper the measuring of the temperature and time dependences of kinematic viscosity of liquid Al-Y (up to 10 at.% Y), $Al_{87}Ni_8Y_5$, $Al_{86}Ni_8(Ce/La)_6$, $Al_{86}Ni_6Co_2Gd_4(Tb/Y)_2$ alloys was carried out by the method of damped torsional vibrations. It have been study the influence of time isothermal holding of the $Al_{99}Y_1$, $Al_{97}Y_3$, $Al_{95}Y_5$ melts on the structure of ingots at crystallization by X-ray diffraction method, metallographic analysis and differential thermal analysis.

An irreversible non-monotonic change of the melts viscosity above the temperature of melting brought about by the destruction of their microheterogeneous state inherited from the multi-phase solid sample has been found out. It is shown that for the melts transition into the quasi-equilibrium state long isothermal holding is necessary. At the temperatures close to the melting temperature the relaxation times are order of 300 minutes. The relaxation time decreases with increase of the melt temperature. It have been shown, that for the same structures of alloys of binary system Al-Y the morphology of formed structures is various and depends on time isothermal holding in a liquid condition.

On the basis of the conception about of a micronon-uniform structure of melts in view of the ultrametric dynamic theory of a molecular field the model of a nonmonotonic relaxation of the nonequilibrium melts has been offered. According to the offered approach, the key parameter, which influences viscosity, is the concentration of nonequilibrium microgroups of atoms. In the beginning of isothermal holding of melt the size of these microgroups is great enough, but their concentration is small and does not render essential influence on viscosity. Eventually the concentration of these microgroups is changing. That is determined by two processes: dissolution the largest and dispersion the finest of microgroups. The first process (that is dissolution) leads to increase in concentration of nonequilibrium microgroups in melt, the second (that is dispersion) leads to reduction of their total. Joint influence of these two processes is shown in nonmonotonic change of viscosity investigated melts. The theoretical curves of time dependences received by us will qualitatively well be coordinated with our experimental data.