
AMORPHOUS METALS

An MRS-Europe Symposium Report

The symposium entitled "Amorphous Metals and Nonequilibrium Processing" was devoted to the connections between various approaches to amorphization of metals, ranging from traditional techniques, such as melt spinning and vapor quenching, to laser irradiation, and from ion-beam mixing to solid-state reaction. Three of the six oral sessions focused on the processes, while the other three concentrated on the properties of amorphous phases as produced by the various processes. In all, the program comprised 49 scientific papers.

A.R. Yavari opened the first session with a survey of the basic kinetic considerations to predict glass formation or crystallization in melt quenching. A number of speakers then discussed technical aspects of melt spinning as well as scanned CW-Laser irradiation, two techniques that yield cooling rates up to about $10^6 K/sec$.

The second day was opened by an excellent plenary talk by H.K.J. Buschow discussing magnetic and electronic properties and showing perspectives on applications of amorphous metals in data recording and storage. The tone for the session on ion beams and chemical processes was set by M.A. Nicolet with a talk on what is and what isn't presently understood about amorphization by ion beams. Exciting new experiments on the amorphization by solid-state reactions were reported by two speakers later in the session. The process is carried out at a temperature too low for crystallization but sufficient for fast diffusion by one of

the component species, and promises the production of amorphous alloys of almost arbitrary dimensions. The last session on processes was devoted to ultra-rapid quenching and nanosecond or picosecond laser quenching. Both methods yield cooling rates in excess of $10^{10} K/sec$ and offer a wide range of amorphous alloys, but are basically limited to thin films.

The sessions devoted to properties treated the subjects of crystallization, low-temperature properties, and atomic and electronic structures of amorphous metals. Among the highlights were talks on the micromechanisms of crystallization in glassy metals, as compared with those in amorphous semiconductors, and on properties of amorphous metals at very high pressure. A poster session complemented the scientific program of the symposium.



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