

## 비정질 합금의 구조무질서화에 미치는 충진률 영향

박경원\*, 이창면, 이재철, Masato Wakeda, Yoji Shibutani, Michael L. Falk

### **Packing density effect on the structural disordering in amorphous alloys**

**Kyoung-Won Park<sup>1</sup>, Chang-Myeon Lee<sup>1</sup>, Masato Wakeda<sup>2</sup>, Yoji Shibutani<sup>2</sup>,  
Michael L. Falk<sup>3</sup>, Jae-Chul Lee<sup>1,\*</sup>**

<sup>1</sup> Department of Materials Science and Engineering, Korea University, Seoul 136-701, Korea

<sup>2</sup> Department of Mechanical Engineering, Osaka University, Osaka 565-0871, Japan

<sup>3</sup> Department of Materials Science and Engineering, Johns Hopkins University, Baltimore, MD 21218, USA

#### **Abstract**

This study demonstrates that elastostatic compression imposed on amorphous alloys at room temperature induces irreversible structural disordering. The rate of disordering depends on the atomic packing density as determined by the fraction of the material in short-range ordered (SRO) atomic environments. The structural disordering, measured experimentally by differential scanning calorimetry, in turn alters the mechanical properties of the material. A combination of experiments and molecular dynamics simulations are used to explore fundamental issues related to shear-induced disordering during elastostatic compression.

**Keywords** : amorphous alloy, structural disordering, free volume, atomic packing density