

专刊

In situ X-ray diffraction investigation of compression behavior in  $Gd_{40}Y_{16}Al_{24}Co_{20}$  bulk metallic glass under high pressure with synchrotron radiation

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摘要

The compression behavior of the heavy RE-based BMG  $Gd_{40}Y_{16}Al_{24}Co_{20}$  under high pressure has been investigated by in situ high pressure angle dispersive X-ray diffraction measurements using synchrotron radiation in the pressure range of 0~33.42 GPa at room temperature. By fitting the static equation of state at room temperature, we find the value of bulk modulus B is  $61.27 \pm 4$  GPa which is in good agreement with the experimental study by pulse-echo techniques of 58 GPa. The results show that the amorphous structure in the heavy RE-based BMG  $Gd_{40}Y_{16}Al_{24}Co_{20}$  keeps quite stable up to 33.42 GPa although its compressibility is as large as about 33%. The coexistence of normal local structure similar to that of other BMGs and covalent bond structure similar to those of oxide glasses may be the reason for the anomalous property under high pressure of the  $Gd_{40}Y_{16}Al_{24}Co_{20}$  BMG.

关键词 [bulk metallic glass](#), [In situ X-ray diffraction](#), [compression behavior](#), [high pressure](#), [synchrotron radiation](#)

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