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High-Energy X-ray Diffraction Study of Liquid Structure of Zr-based Binary Alloys AKITOSHI MIZUNO, SEIICHI MATSUMURA, MASAHITO WATANABE, Gakushuin University, SHINJI KOHARA, MASAKI TAKATA, Japan Synchrotron Radiation Research Institute — High-energy ($E = 113$ keV) synchrotron x-ray diffraction experiments were performed for metallic glass-forming Zr-Cu alloys in the liquid state at high temperatures. Accurate structure information of highly reactive melts has been obtained by applying conical nozzle levitation technique as a containerless method. The total structure factor extracted for the liquid $Zr_{50}Cu_{50}$ alloy near its melting temperature shows a particular shoulder at the high- Q side on the second peak as well as the liquid $Zr_{70}Cu_{30}$ alloy. This feature of structure factor is similar to those of structure factors observed in deeply undercooled metallic liquids or metallic glasses, in which local icosahedral short range ordering was found to exist. With the use of reverse Monte Carlo simulation analysis, it was demonstrated that short-range ordered clusters exist even in the equilibrium liquid state of $Zr_{70}Cu_{30}$ alloy.

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