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Unique local structures of Ca, Ti, Fe and Zr in natural glasses formed by meteorite impact AKIRA YOSHIASA, TSUBASA TOBASE, Kumamoto University, MAKI OKUBE, Tokyo Institute of Technology, LING WANG, HIROSHI ISOBE, TSUTOMU MASHIMO, Kumamoto University, GRADUATE SCHOOL OF SCIENCE AND TECHNOLOGY COLLABORATION, MATERIALS AND STRUCTURES LABORATORY, TOKYO INSTITUTE OF TECHNOLOGY COLLABORATION — The local structures of cation in tektite from six strewn fields, impact-related glass, and non-impact-related glass were studied by Ca, Ti, Fe and Zr K-edge X-ray absorption near edge structure (XANES) and extended X-ray absorption fine structure (EXAFS). Shock compression also causes local structural changes of gest and minor elements as well as transition of host structures. How to be left a record is peculiar by each element. The XAFS measurements were performed at the beam lines BL-NW10A and BL-9C, KEK, Japan. The comparison of XANES spectra and bonding distances between crystalline reference minerals and natural glasses was done. Based on the different valence states of iron, the degrees of oxidation states were estimated. The local structures of Ca, Ti and Zr ions are useful probe for physical conditions and formation process of glasses. Tektites experienced high quenching rates and a reduced atmospheric environment when they were ejected into outer space. Other impact-related glass, which was remained close to the crater, experienced a more complicated environment. The local structural changes of cation in the impact-related glass are rich in a variety. Analysis of local structure is help to compare their formation process and distinguish them.

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