

Local Structure of Molten CdCl_2 Systems

Y. Okamoto^{a,b}, H. Shiwaku^b, T. Yaita^{a,b}, S. Suzuki^a, K. Minato^a, and H. Tanida^c

^a Department of Materials Science, Japan Atomic Energy Research Institute, Tokai-mura, Naka-gun, Ibaraki 319-1195, Japan

^b Synchrotron Radiation Research Center, Japan Atomic Energy Research Institute, Kouto, Mikazuki-cho, Sayo-gun, Hyogo-ken 6795143 Japan

^c Japan Synchrotron Radiation Research Institute, Kouto, Mikazuki-cho, Sayo-gun, Hyogo-ken 6795198 Japan

Reprint requests to Dr. Y. O.; Fax: +81-29-282-5922, E-mail: okamoto@molten.tokai.jaeri.go.jp

Z. Naturforsch. **59a**, 819 – 824 (2004); received June 25, 2004

The local structure of molten CdCl_2 was investigated by X-ray absorption fine structure (XAFS) and X-ray diffraction (XRD) analyses. The nearest Cd^{2+} - Cl^- distance decreases from 2.61 Å in the room temperature solid state to 2.47 – 2.50 Å in the molten state. The coordination number decreases from 6 in the solid to 4 in the melt. The obtained structural parameters from the XAFS and the XRD analyses suggest that a tetrahedral coordination $(\text{CdCl}_4)^{2-}$ is predominant in molten CdCl_2 . The XAFS result of a molten 50% CdCl_2 -KCl mixture shows that the 4-fold $(\text{CdCl}_4)^{2-}$ structure holds also in the mixture.

Key words: Molten Salt; XAFS; X-ray Diffraction; Structure; Pyrochemistry.