Poster Presentation

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Crystal Structure Analysis of Magnetically Oriented D-Arabinitol Microcrystal

S. Yamane[1], K. Matsumoto[2], F. Kimura[3], T. Kimura[4]

[1]*Kyoto University, Division of Forest and Biomaterials Science, Kyoto, Japan*

We have proposed magnetically oriented microcrystal array (MOMA) technique as a new technique of crystal structure analysis. With this technique, single crystal X-ray diffraction analysis is made possible from a microcrystalline powder. Biaxial crystals, having three different values of magnetic susceptibility ($\chi1>\chi2>\chi3$), are aligned three dimensionally under a frequency-modulated elliptical magnetic field. Biaxial microcrystal suspended in an ultraviolet (UV) light-curable monomer matrix is aligned three dimensionally under the magnetic field, followed by consolidation of the alignment by the photopolymerization the matrix. Biaxial crystal group has three crystal systems: orthorhombic, monoclinic and triclinic systems. The analysis of crystals belonging to the triclinic system is important because ca. 23 % of organic crystals are triclinic. We have so far succeeded in determining crystal structures of orthorhombic and monoclinic systems by using the MOMA technique[1, 2, 3] but crystals of triclinic system have not been examined yet. Therefore, in this report, we attempt to determine the crystal structure of D-arabinitol, belonging to the triclinic system, by using the MOMA technique. 10 wt% D-arabinitol / XVL14 (UV light-curable monomer) suspension was subjected to 8-T magnetic field (the speed of rotation changed between 10 rpm and 40 rpm at every 90°) and was consolidated by irradiation of UV light. The prepared MOMA was subjected to the X-ray diffraction measurement. The obtained diffraction spots were well resolved and the average of half widths was about 3.9°. These results indicate that the D-arabinitol microcrystals were aligned three dimensionally in the MOMA and the high quality of alignment was achieved. These results indicate that the obtained diffraction patterns are equivalent to those obtained from corresponding single crystal.

[1] *T. Kimura, C. Chang, F. Kimura et al. J. Appl. Cryst., 2009, 42, 535.,* ***[2]*** *F. Kimura, K. Mizutani, T. Kimura et al. Cryst. Growth & Des., 2011, 11, 12.,* ***[3]*** *F. Kimura, T. Kimura, W. Oshima et al. J. Appl. Cryst., 2010, 43, 151.*

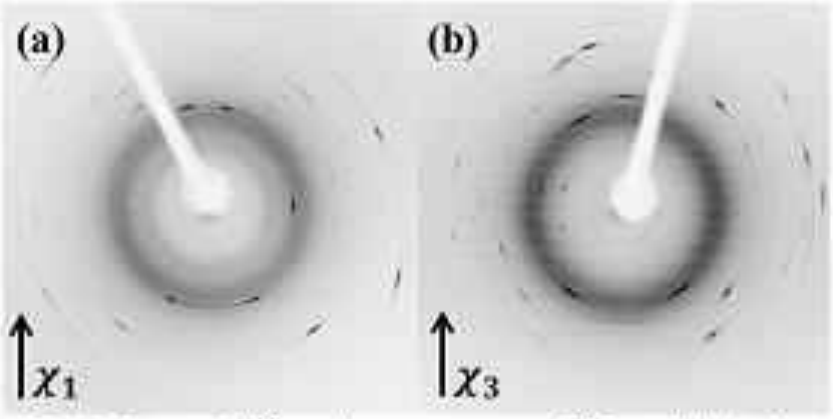

Fig.1 X-ray diffraction patterns of D-arabinitol MOMA. The arrow is (a) χ_1 direction and (b) χ_3 direction.

Keywords: D-arabinitol, magnetically oriented microcrystal array, triclinic