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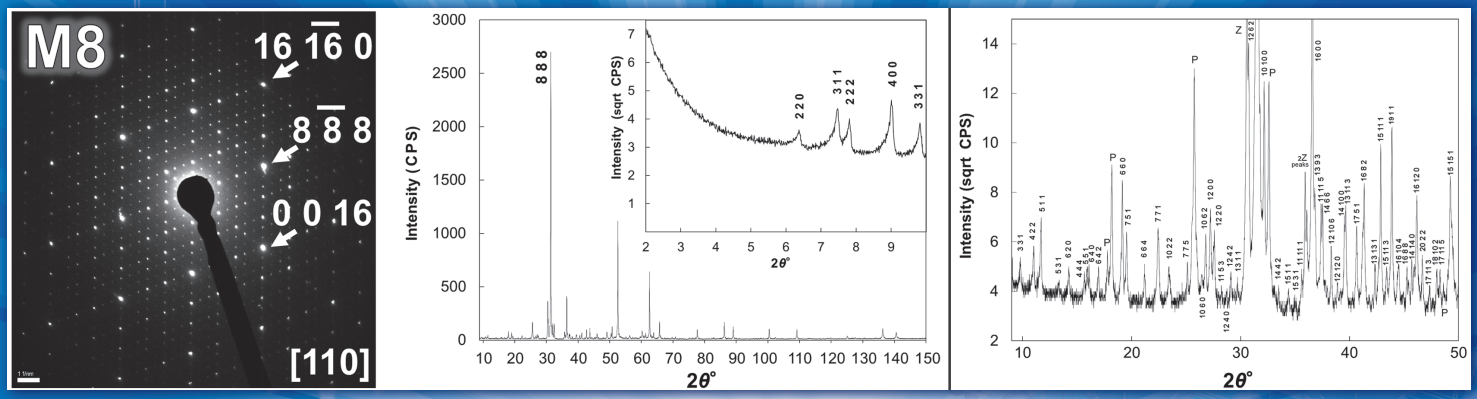

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EDITORIAL

TECHNICAL ARTICLES

NEW DIFFRACTION DATA

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On the Cover: The cover figure highlights the study of a murataite phase with a very large 8x8x8 (M8) superstructure with FCC basic sub-cell by Ryosuke Maki; Peter Morgan and Yoshikazu Suzuki. The lattice constant of the cubic M8 supercell is 39.269(1) Å. The TEM-SAED image in the (110) plane shows the superstructure peaks (left). The XRD powder pattern on a linear scale (middle) dominantly shows the sub-cell lines. A portion of the XRD pattern on a square root scale (right) shows the low intensity superlattice lines more clearer. The minor impurities pseudobrookite (P) and zirconolite (Z) are labeled. (Courtesy: Ryosuke S. S. Maki, Peter E. D. Morgan, and Yoshikazu Suzuki).

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XRD analysis of a stony-iron meteorite using a 2D HPAD detector

A stony-iron meteorite was analyzed using a SmartLab® equipped with a HyPix-3000 2D HPAD detector. Inside a stony-iron meteorite, there are transparent parts similar to glass and opaque parts similar to metal. The transparent parts were thought to be non-crystalline (amorphous). However, when measurement of the transparent part was actually performed, only one diffraction line was observed.

In general, when measurement is done with a 0D or a 1D detector, the range in which diffraction X-rays can be detected from the sample is limited to a certain region. However, it is possible to acquire information on multiple lattice planes by using a wide 2D area detector while oscillating the sample.

When the 2D diffraction image obtained (Fig.1) was converted to a 2θ-I profile (Fig. 2), and qualitative analysis of the transparent part was carried out, it was possible to identify forsterite (Mg_2SiO_4). Since diffraction spots were observed, it was conjectured that the glass-like transparent part is a single crystal or is comprised of an extremely small number of crystal grains.

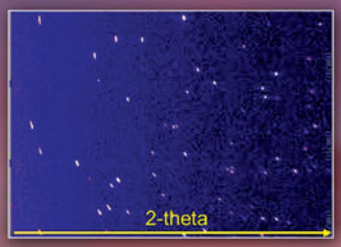

Fig. 1

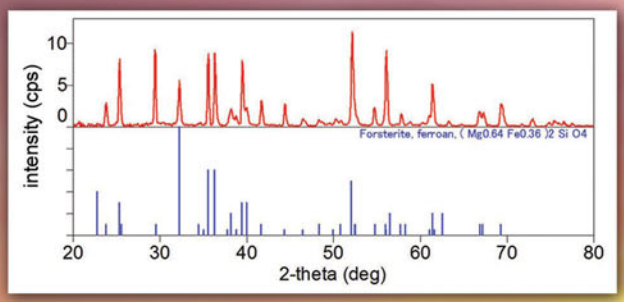

Fig. 2

SmartLab diffractometer with HyPix-3000 detector

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