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Phase transition of MnF_2 by shock compression up to 33 GPa
TERUHISA HONGO, NOBUAKI KAWAI, KAZUTAKA NAKAMURA, KEN-ICHI
KONDO, Materials and Structural Laboratory, Tokyo Institute of Technology,
TOSHIYUKI ATOU, KUNIO YUBUTA, KEIJI KUSABA, Institute for Materi-
als Reserch, Tohoku Univeisity, MASAE KIKUCHI, Kansei Fukushi Laboratory,
Tohoku Fukushi University — Shock-induced phase transition of MnF_2 with the
rutile structure was investigated using gun method in the pressure range between
3 and 33 GPa. Recovered samples were examined using X-ray diffraction method
and transmission electron microscope (TEM) observation. The $\alpha\text{-PbO}_2$ -type phase
was observed in the recovered samples, and its yield had a maximum at about 10
GPa. Lamella patterns consisting of the rutile-phase and the $\alpha\text{-PbO}_2$ -type phase
intergrowth texture were observed in the TEM images of the sample shock-loaded
to 9 GPa. The crystallographic relationship between both phases can be expressed
as $(001)_{\alpha\text{-PbO}_2} \parallel (-101)_{\text{rutile}}$ and $[110]_{\alpha\text{-PbO}_2} \parallel [111]_{\text{rutile}}$ by TEM observation. This
directional relationship is different from that of TiO_2 previously reported, suggesting
that possibility of a new mechanism for the phase transition from the rutile-type to
the $\alpha\text{-PbO}_2$ -type through fluorite-related structure under high pressure.

Teruhisa Hongo
Materials and Structures Laboratory, Tokyo Institute of Technology

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