

英文題目 (Title)

Growth of perovskite-type oxynitride single crystals doped with various foreign metals

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和文題目

異種金属ドーピングされたペロブスカイト型酸窒化物強誘電体単結晶の育成

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英文要旨 (Abstract)

Perovskite-type oxynitrides have attracted much attention due to their excellent dielectric properties. Although extensive efforts to synthesize perovskite-type oxynitrides in various forms, such as powders and sintered ceramics, the growth of large and high-quality single crystals has remained a significant challenge. In recent years, their single crystals have been studied to understand their fundamental properties. In this work, millimeter-sized single crystals of BaTaO_2N were successfully grown by an ammonia (NH_3)-assisted BaCl_2 flux method as shown in Fig.1. To the best of our knowledge, the achieved crystal size is the largest value among perovskite-type oxynitride single crystals reported to date. The dielectric permittivity of the single crystals was ≈ 230 , which is similar to those of BaTaO_2N epitaxial thin films on $\text{SrRuO}_3/\text{SrTiO}_3$ reported previously. The ferroelectric behavior of the single crystals was not confirmed in the polarization-electric field loop measurement. The successful crystal growth and electrical property measurements of the millimeter-sized single crystals of BaTaO_2N emphasize the key role of the NH_3 -assisted flux method in advancing both fundamental condensed matter physics and potential industrial applications of perovskite-type oxynitrides.

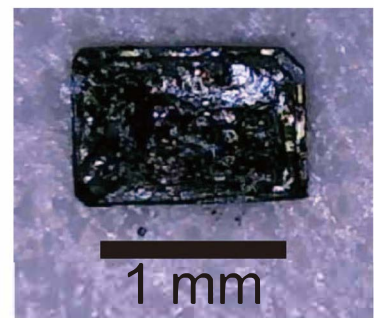


Fig. 1 Optical microscopy image of the BaTaO_2N crystal grown by the NH_3 -assisted BaCl_2 flux method.