

## Supporting Information to *Dalton Transactions*

### **Molten BaCN<sub>2</sub> for the sintering and crystal growth of dielectric oxynitride perovskite Sr<sub>1-x</sub>Ba<sub>x</sub>TaO<sub>2</sub>N ( $x = 0.04\text{--}0.23$ )**

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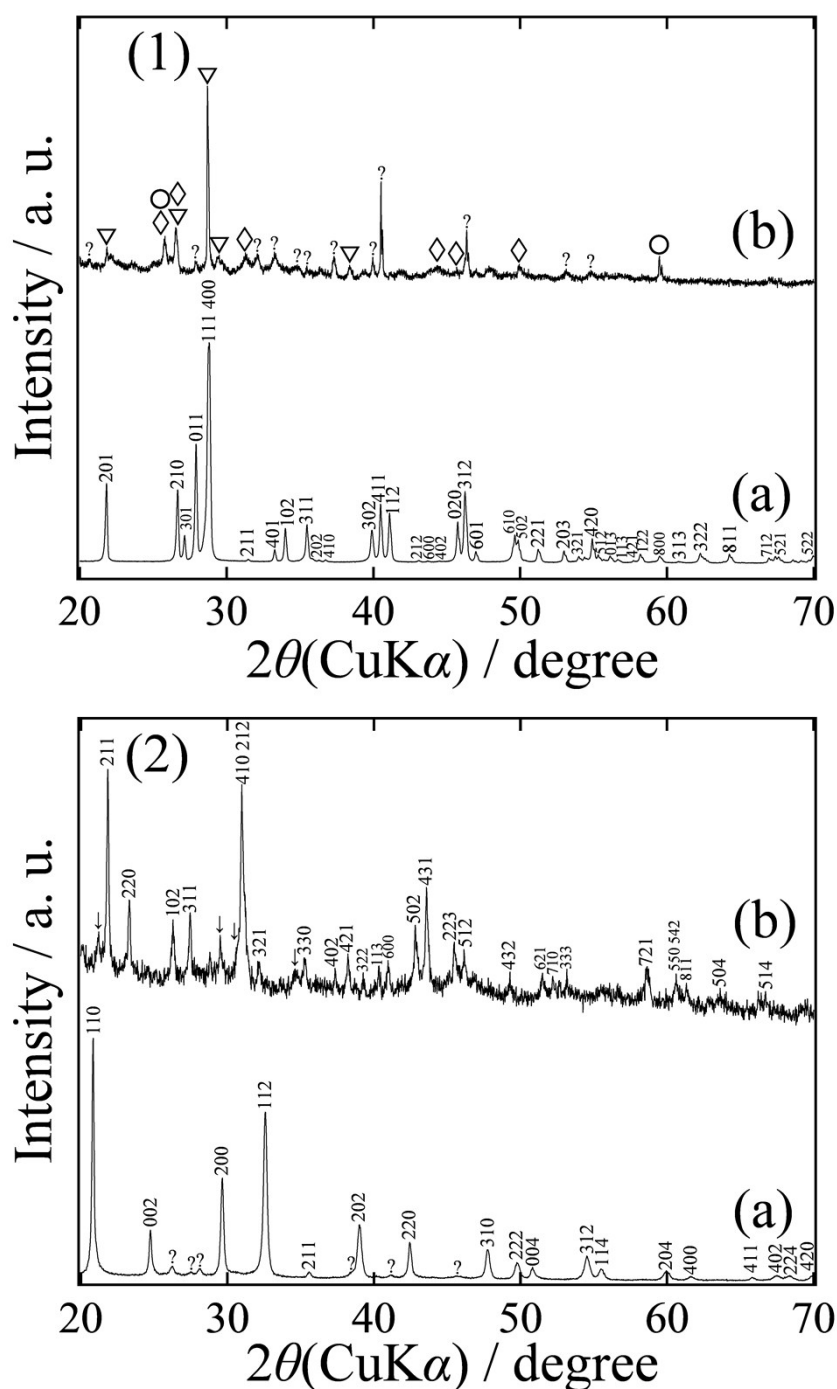
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**Fig. S1** XRD patterns of (1) $\alpha$ -SrCN<sub>2</sub> and (2)BaCN<sub>2</sub> powders for (a)as-prepared and (b)the annealed samples.  $\alpha$ -SrCN<sub>2</sub> and BaCN<sub>2</sub> were annealed at approximately 1100 and 900 °C for 5 h. Indexed diffraction peaks shown in (1)(a), (2)(a), and (2)(b) are  $\alpha$ -SrCN<sub>2</sub> (JCPDS 51-541), tetragonal new phase of BaCN<sub>2</sub><sup>26</sup>, and rhombohedral BaCN<sub>2</sub> (JCPDS 51-542), respectively. Inverse triangles, diamonds, circles, arrows, and question marks indicate Sr(OH)<sub>2</sub> (ICSD 26029), graphite (ICSD 53781), SrC<sub>2</sub> (JCPDS 3-0542), Ba(OH)<sub>2</sub> (ICSD 56828), and unknown phases, respectively.