

Supporting information

Massive hydration-driven swelling of layered perovskite niobate crystals in aqueous solutions of organo- ammonium bases

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S1. Powder XRD data of $\text{KCa}_2\text{Nb}_3\text{O}_{10}$ before and after acid treatment.

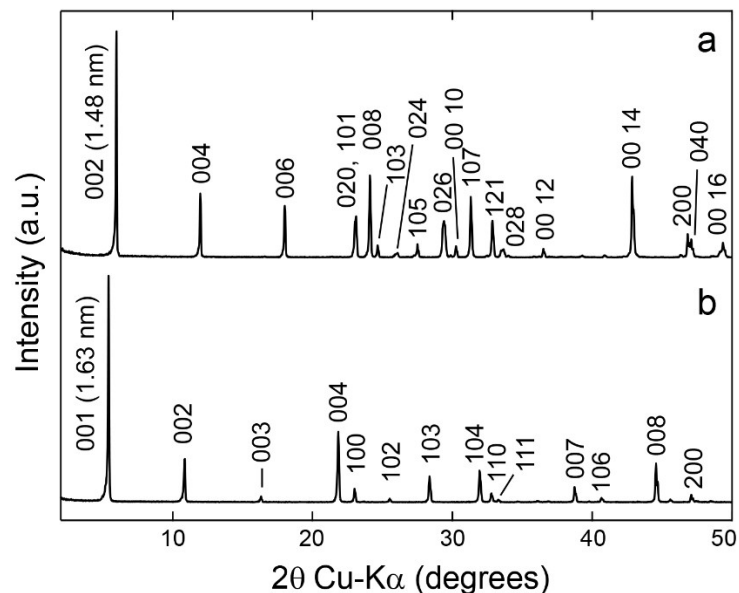


Fig. S1 XRD patterns of (a) $\text{KCa}_2\text{Nb}_3\text{O}_{10}$ and (b) $\text{HCa}_2\text{Nb}_3\text{O}_{10} \cdot 1.5\text{H}_2\text{O}$ obtained by the acid treatment of $\text{KCa}_2\text{Nb}_3\text{O}_{10}$. All the peaks can be indexed in terms of orthorhombic [$a = 0.3875(1)$ nm, $b = 0.7709(3)$ nm, $c = 2.9486(8)$ nm] and tetragonal [$a = 0.3855(1)$ nm, $c = 1.6225(2)$ nm] unit cell dimensions for $\text{KCa}_2\text{Nb}_3\text{O}_{10}$ and $\text{HCa}_2\text{Nb}_3\text{O}_{10} \cdot 1.5\text{H}_2\text{O}$, respectively, which are compatible with previous reports.^{1,2}

S2. Polarized optical microscope image containing non-swollen component of the crystals.

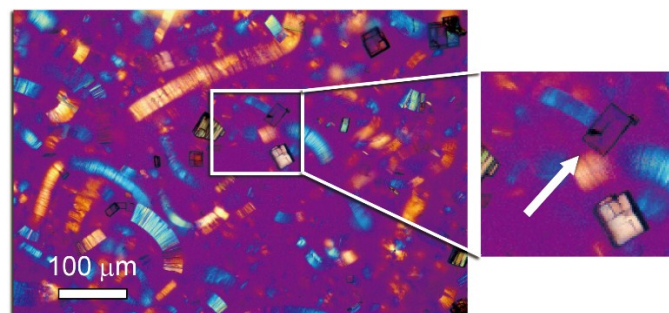


Fig. S2 Polarized optical microscope image for the sample in the TBAOH solution at $\text{TBA}^+/\text{H}^+ = 0.1$, highlighting the non-swollen component of the crystals.

S3. Powder XRD data of swollen crystals at a relative humidity of 95%.

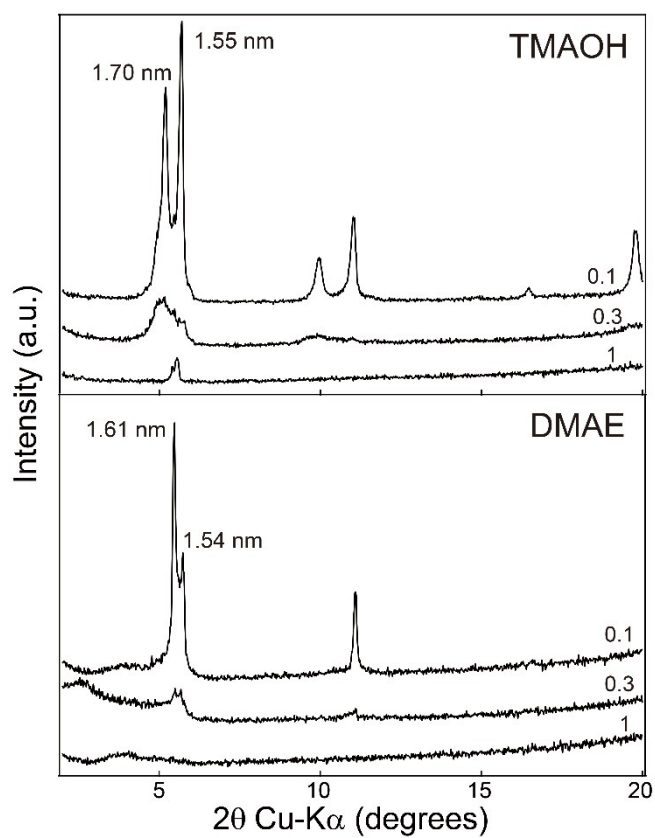


Fig. S3 XRD data of the swollen samples in the TMAOH (upper panel) and DMAE (lower panel) solutions at indicated N^+/H^+ molar ratios. The numerals on the peak correspond to the interlayer distances.

Reference

1. A. J. Jacobson, J. T. Lewandowski and J. W. Johnson, *J. Less-Common Met.*, 1986, **116**, 137–146.
2. M. Dion, M. Ganne and M. Tournoux, *Mater. Res. Bull.*, 1981, **16**, 1429–1435.