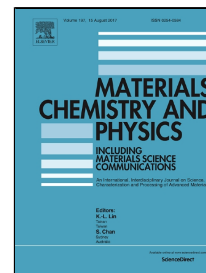


Accepted Manuscript

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PII: S0254-0584(17)30491-1
DOI: 10.1016/j.matchemphys.2017.06.048
Reference: MAC 19788
To appear in: *Materials Chemistry and Physics*
Received Date: 28 March 2017
Revised Date: 11 June 2017
Accepted Date: 22 June 2017

Please cite this article as: Shan Bai, Jian Zhang, Zhuwen Chen, Yanding Wang, Mei Hong, Tomoaki Karaki, Near-Room-Temperature Synthesis of Niobate Hydrate Particles with Hexagonal-Platelike Morphologies, *Materials Chemistry and Physics* (2017), doi: 10.1016/j.matchemphys.2017.06.048

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Near-Room-Temperature Synthesis of Niobate **Hydrate** Particles with **Hexagonal-Platelike Morphologies**

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Abstract

Platelike alkaline niobates, which are an important class of templates for growing lead-free textured piezoceramic materials, **are usually synthesized at temperatures greater than 900 °C from a melting process. We previously developed a hydrothermal route to niobate hydrate at temperatures above 100 °C and combined it with heat treatment to yield platelike niobate perovskite. In this contribution, we present the first report on near-room-temperature wet-chemical preparation of platelike potassium niobate (KN) and potassium sodium niobate (KNN) hydrate particles. Hexagonal-platelike KN-hydrate particles that were 1.5–4.0 μm wide and 0.1–0.35 μm thick were prepared via low temperature synthesis at 60 °C over a period of 24 h in a 9 mol/L KOH solution. Similarly, KNN hydrate particles with a hexagonal-platelike shape were prepared at 40 °C over a period of 48 h in 6 mol/L [OH⁻]. Sodium dodecyl benzene sulfonate (SDBS) surfactant was added as a shape modulator. Calcining the KN hydrate particles at 500 °C for 2 h transformed the crystals to a stable perovskite phase while maintaining the platelike**

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