

Supplemental Material

An alternative approach to increasing Li-mobility in Li-La-Nb/Ta garnet electrolytes

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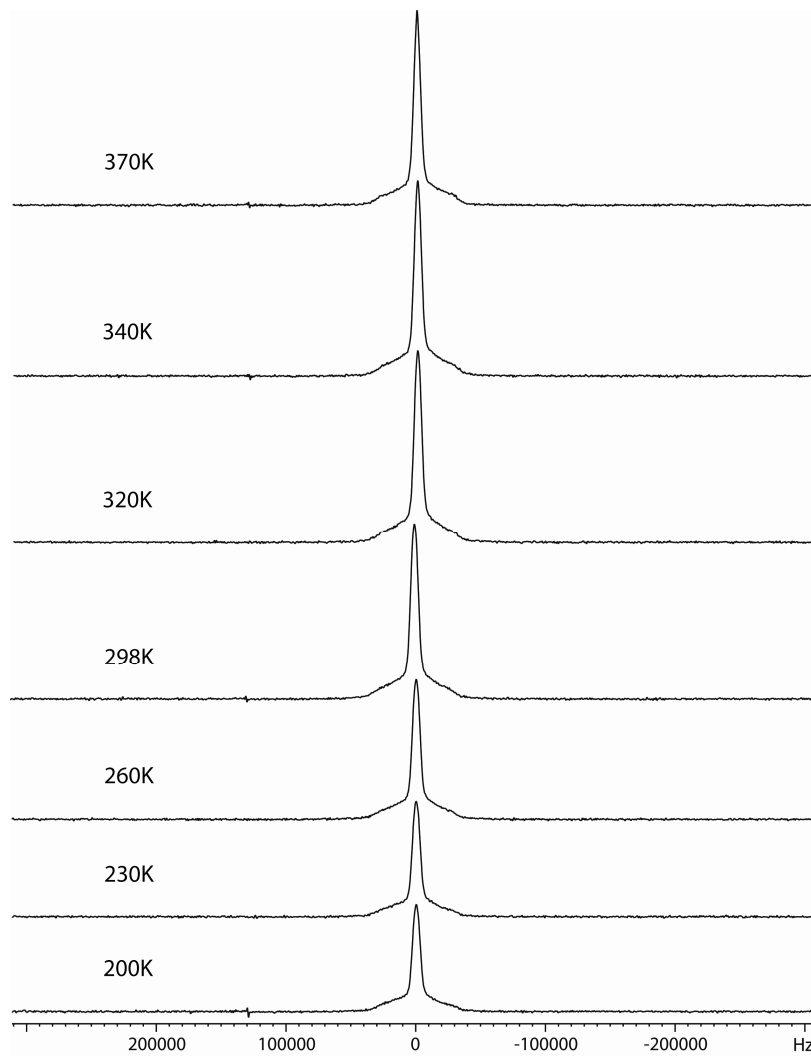


Figure S1: The variable temperature ^7Li NMR spectra of LiTa Nb (pink).

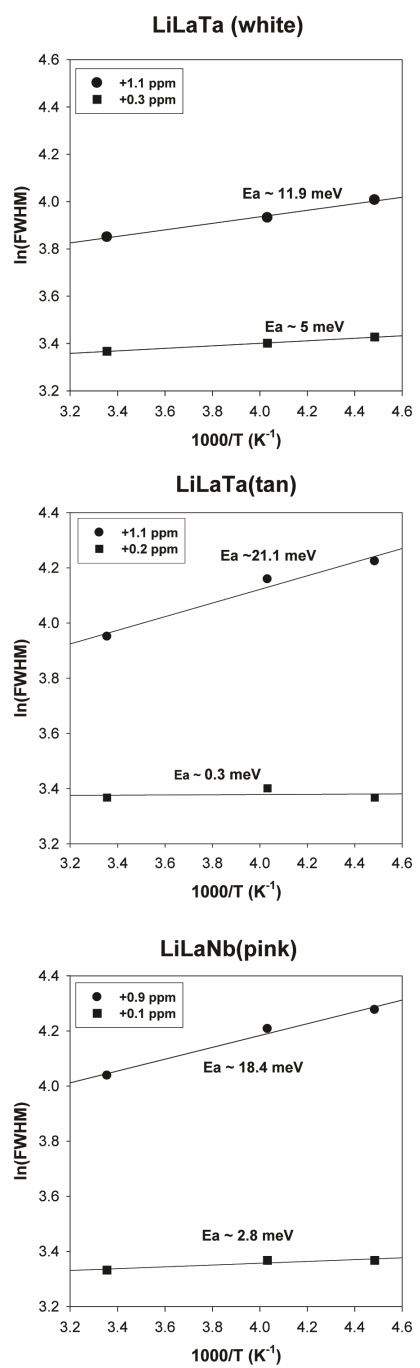


Figure S2: The temperature variation of the ^6Li MAS NMR line width for the two different Li environments for select processed samples.

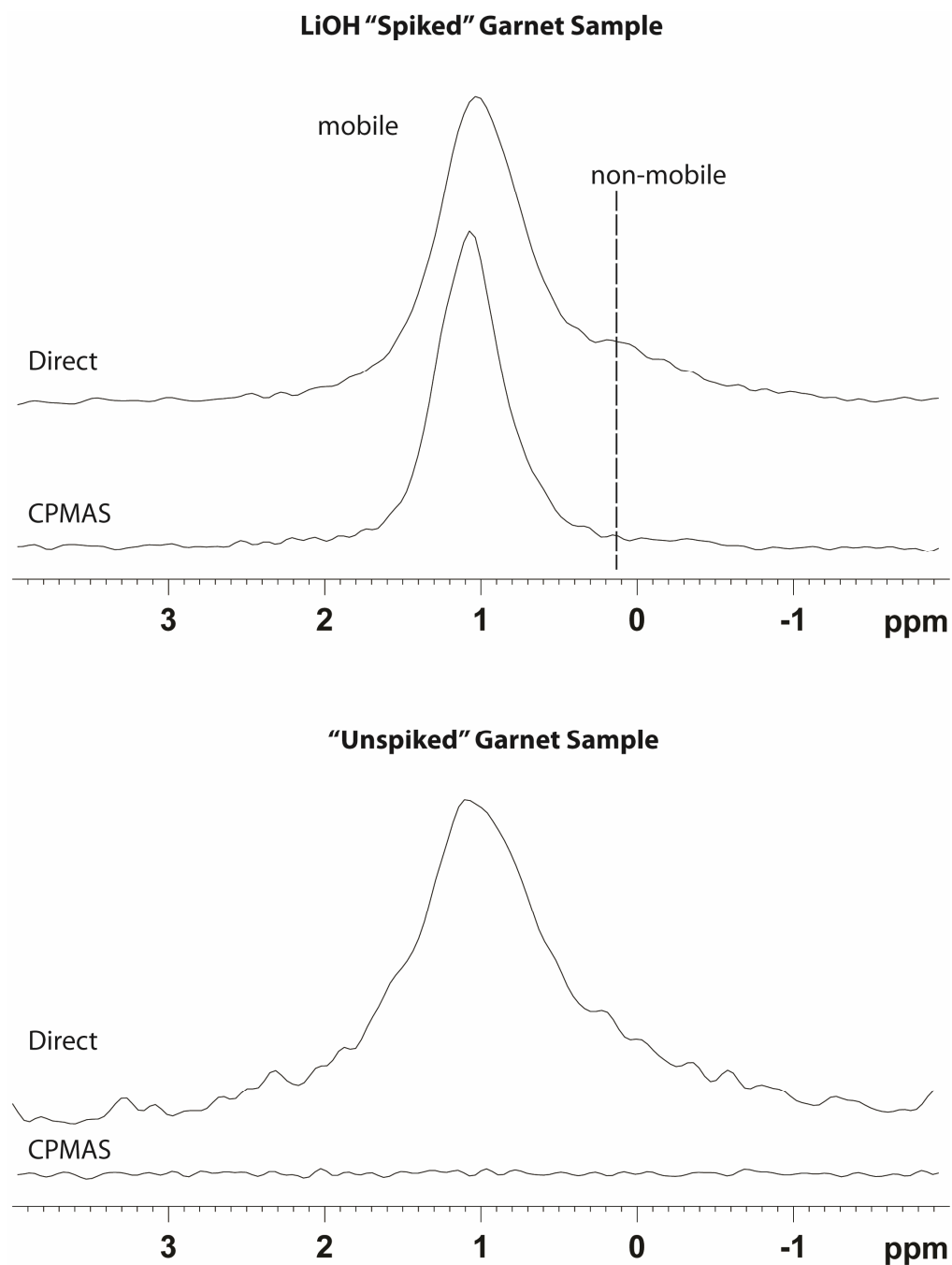


Figure S3: The single pulse direct ${}^6\text{Li}$ and ${}^1\text{H}$ - ${}^6\text{Li}$ CPMAS NMR for a garnet sample “spiked” with LiOH during processing, and a normal (“unspiked”) garnet sample following processing. Note that for the “spiked” sample, the ${}^1\text{H}$ containing Li environments are enhanced under CP (this case the tetrahedral LiOH environment), while the non-mobile Li environment is filtered out. In the regularly processed garnet sample no LiOH (or hydrogen containing) Li environment is observed under CP, even though the direct spectrum for this sample reveals a single mobile resonance. These results show that there is not significant LiOH present in the regularly processed garnet materials. See text for additional details.

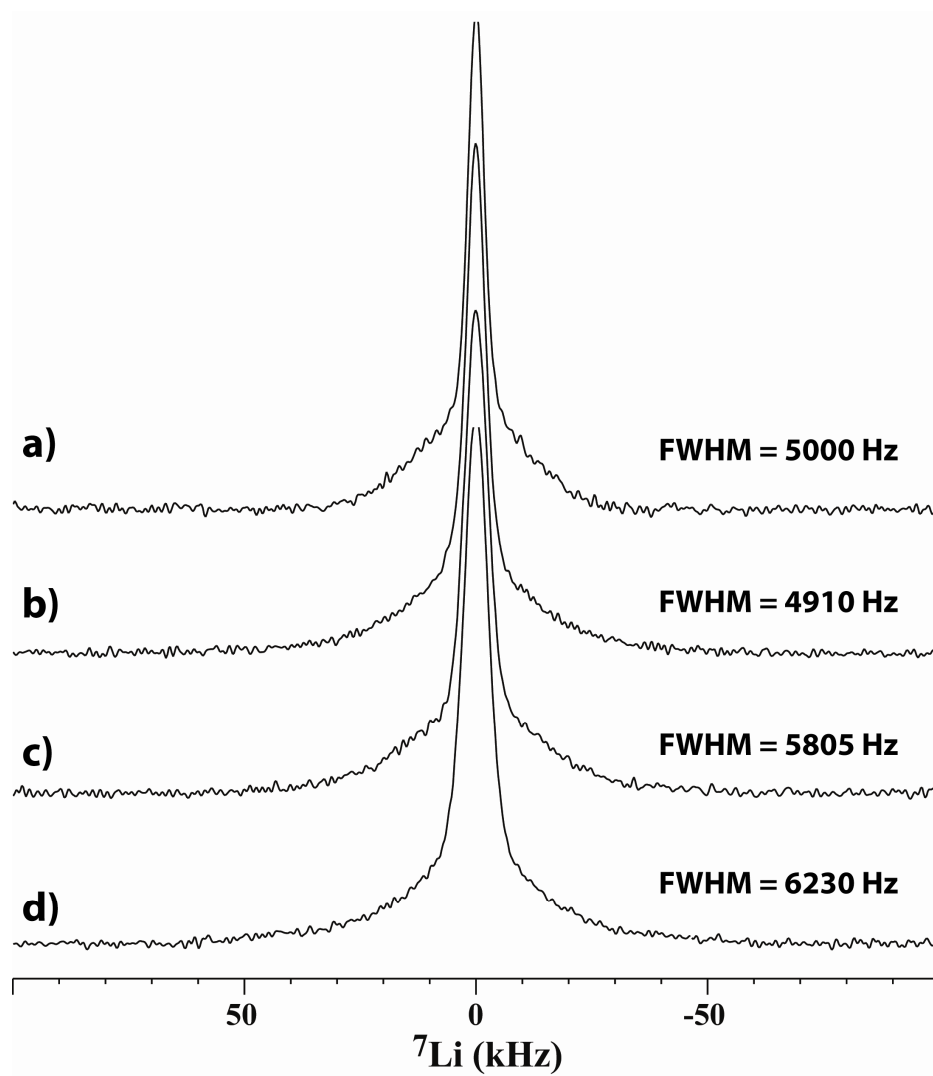


Figure S4. The static ^7Li NMR spectra at room temperature (RT) for pH ~3 exchanged materials: a) white Ta b) lite tan Ta, c) pink Nb, d) tan Nb.