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HYBRID NASICON TYPE BATTERIES MATERIALS SOLID-STATE NMR RESEARCH

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Widely used lithium ion batteries face problems such as the reduction of effectiveness after a long time usage, dendrite and toxic salt formation, complicated disposal. A NASICON type material NaTi₂(PO₄)₃, made from naturally abundant sodium, is a potential candidate for anode synthesis, of next generation batteries, because of its thermal and structural stability and good ionic conductivity. To analyze how batteries work and why they fail, a reliable spectroscopy method called Nuclear Magnetic Resonance (NMR) is used, to measure and investigate stuctures of crystalline and amorphous compounds on a molecular scale. By using NMR relaxation filter methods it is possible to create a library of ²³Na, ³¹P and ¹H nuclei spectra and use it to investigate potential batteries.



Fig. 1. a)²³Na spectrum with different impulse delay times, b)²³Na spectrum approximated with theoretical curves c)³¹P spectrum with different impulse delay times d) ¹H spectrum .

[1] Wu, M., Ni, W., Hu, J., & Ma, J. (2019). NASICON-Structured NATI2(PO4)3 for sustainable energy storage. Nano-Micro Letters, 11(1).