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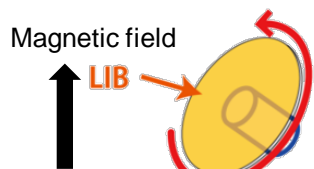
# Applications and technical developments of solid-state NMR

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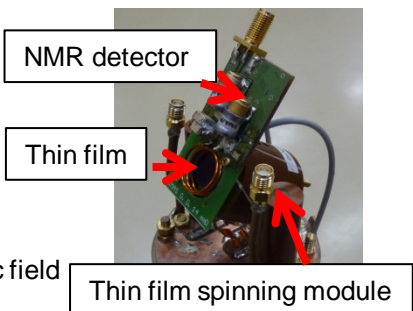
### [1] Thin film and device NMR

Development of high resolution NMR probe for lithium ion batter (LIB)

Thin film high resolution NMR probe

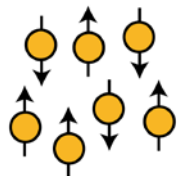


Fast spinning of LIB in magnetic field

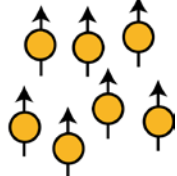


### [2] Dynamic nuclear polarization utilizing coordination polymer

Conventional method

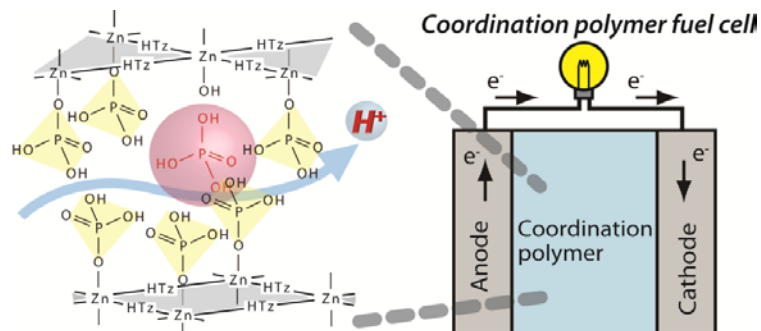


This work



Polarization of nuclear spins which allows hypersensitive NMR spectra!!

### [3] Proton conducting coordination polymers and fuel cell



Content:

Solid-state nuclear magnetic resonance (NMR) has been a powerful spectroscopy which provides atomic-level structures and dynamics of solid materials.

[1] We have developed new solid-state NMR methods for mass-limited samples and functional thin films. A work in progress is the development of in-situ device high-resolution NMR. The target devices include lithium ion batteries, fuel cells, and organic photovoltaics. We will address structures and dynamics of devices in working.

[2] The inherent disadvantage of NMR is weak sensitivity compared with those of other spectroscopies. We have developed the new method of dynamic nuclear polarization to overcome the weak sensitivity.

[3] The design of fast proton conducting solids is of interest to materials chemistry from the viewpoint of fuel cell technology. Based on state-art of NMR characterizations, we elucidated proton transport mechanism, developed super proton conducting coordination polymers, and performed first demonstration of coordination polymer fuel cell.

Keywords : Nuclear magnetic resonance, Coordination polymer, Solid-state ionics

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